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Lowell Textile Journal

CHEMISTRY AND DYEING DEPARTMENT OF THE
LOWELL TEXTILE SCHOOL.



Office of LOUIS A. OLNEY, A. C., Professor of Chemistry and Dyeing.

G. CARL SPENCER, S. B., Instructor in General and Industrial Chemistry.

PHILIP R. FRENCH, S. B., Instructor in General and Analytical Chemistry.

WALTER F. HASKELL, B. A., Assistant in Chemistry.

In no department of the Lowell Textile School is there a wider range for study than in that of Chemistry and Dyeing, and a brief account of its purpose, scope of training, and advantages offered

may be of interest to those engaged in the textile industry.

During the latter portion of the 19th century that branch of the textile industry which usually goes by the name of textile coloring, has undergone a remarkable revolution. Previous to 1860 there

in the hands of a few men, who depended upon the secret books of formulæ, that had in many cases been handed down to them through several generations and which they often held as sacred as their Bible. Now and then these books received additions, which



CHEMISTRY LECTURE HALL.

were, with one or two exceptions, no artificial coloring matters, and dependence was placed almost entirely upon the so-called dye woods or natural coloring matters, and certain mineral pigments. At that time the whole art of dyeing was

their owners might have acquired from some of their more communicative fellow-craftsmen, or accidentally discovered while at their work. We say accidentally, for at that time it was not customary for dyers to conduct any systematic examin-

ation of their processes, and in most cases they had no idea of the chemical reactions taking place. They depended entirely on the so-called "Rule of Thumb," and textile coloring could scarcely have been said to possess even the first essentials of a science.

illuminating gas industry. Extended investigations conducted along scientific lines resulted in the number of artificial dye stuffs being greatly increased during the sixties, and with the discovery of artificial alizarine in 1868, the art of textile coloring began to assume



CHEMICAL LABORATORY.

The discovery of mauveine by Perkin in 1856 and magenta by Hoffman in 1858 gave some indication of the possibilities that lay dormant in coal tar, and many of the leading chemists turned their attention toward this heretofore next to valueless by-product of the

a new aspect. It required chemists to work out the most practical and economic methods of applying these new coloring matters; the dyer was obliged to depend on the chemist for much of the information necessary to his trade, and his receipt book began to be replaced

by the writings and investigations of scientific men. In this manner the unclassified knowledge of the older dyers, gradually developed into a science and today, the art of dyeing, together with the manufacture of the necessary dyestuffs, may be looked upon as one of the

of the Chemistry and Dyeing Department of the Lowell Textile School, however, is not to turn out professional chemists capable of engaging themselves as experts in all the numerous branches of chemistry, the course prescribed being such as to educate entirely along



ASSISTANT'S OFFICE.

most important branches of industrial chemistry.

From what has been said, it will be seen that in order to attain the highest efficiency, the modern textile colorist must be thoroughly grounded in chemistry. The object

the line of industrial chemistry, particularly as applied to textile work. It is nevertheless essential that the student shall clearly understand the general principles of chemistry and have a thorough acquaintance with organic chemistry

and analytical work. The superficial knowledge of chemistry, ordinarily received at high schools, academies and the average college is by no means sufficient to prepare a student for satisfactory work in the textile laboratory or to give him the knowledge or experience neces-

must be rigid and exhaustive, while the student is given the use of thoroughly equipped laboratories. It is the constant aim of those in charge, to provide these essentials.

The regular course in Chemistry and Dyeing for the day students extends through three entire school



DYEHOUSE AND DYEING LABORATORY.

sary to cope with the questions and problems of a chemical nature that are constantly arising in the textile plant, especially the dyehouse and bleachery.

That such a training may be realized, the course of instruction

years, and is especially recommended to those who intend to enter any branch of textile coloring, bleaching, or the manufacture or sale of the various dyestuffs and chemicals used in the textile industry.

In addition to acquiring a thorough knowledge of the principles of all branches of dyeing, printing, bleaching, etc., the student by application, study, and conscientious performance of all the prescribed laboratory and practical work, should become efficient in

tunity of taking several subjects in other departments as mechanical drawing, designing, and weaving. This is essential in order that his knowledge of textile work in general, and mill management may be broadened.



PRINTING AND BLEACHING.

the subject of Textile Chemistry, and the methods of testing the various dyestuffs, mordants, etc.

The following outline will give the reader an idea of the different subjects studied. It will be noted that the student is given an oppor-

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FIRST YEAR—SECOND TERM.

General Chemistry.
Stoichiometry.
Elements of Mechanism.
Cloth Analysis.
Qualitative Analysis.
Mechanical Drawing.
Designing.
Hand Looms.

SECOND YEAR.

Textile Chemistry and Dyeing.
Chemical Philosophy.
Quantitative Analysis.
Advanced Inorganic Chemistry.
Organic Chemistry.
Industrial Chemistry.
Applied Mechanics.

OPTIONS :

Designing. Weaving.

THIRD YEAR.

Quantitative Analysis.
Industrial Chemistry.
Advanced Textile Chemistry and Dyeing.
Dye Testing.
Microscopy.
Thesis.

OPTIONS :

Weaving. Mill Engineering.

The study of general chemistry extends through one entire school year, and includes lectures, recitations and a large amount of individual laboratory work. The following subjects are considered :

Chemical Philosophy.—Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formula, valence, periodic law, etc.

Non-Metallic Elements.—Study of their occurrence, properties, preparation, chemical compounds, etc.

Metallic Elements.—Study of their occurrence, properties, metallurgy, chemical compounds, etc.

The Hydrocarbons and their Derivatives.—Study of their occurrence, properties, preparation, uses, etc.

Qualitative Analysis is taught in a thorough manner, and in addition to lectures and recitations, at least fifteen hours per week of laboratory work are required. Before completing the course each student must satisfactorily analyze at least thirty solutions and ten solids which may contain any of the common metals and acids, and six alloys which may contain any of the common metals. At the close of the course, each student is required to pass a written examination upon the subject, as well as a

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practical examination involving the analysis of a solution and a solid.

In the class work which accompanies the Qualitative Analysis special attention is paid to the writing of the equations representing the chemical reactions involved.

While studying Chemical Philosophy, the student becomes familiar with the metric system, and the different thermometric and specific gravity scales, as well as the principles of hydrostatics, including the laws of specific gravity, pneumatics, calorimetry, specific heat, vapor density, the important laws of solution, and the various methods

of determining molecular weights.

The student is also required to deduce formulæ, and work out a large number of problems introduced by the subject.

Under the head of Textile Chemistry and Dyeing is included a lecture course and a practical work course. The outline of the lecture course is as follows:

Technology of Vegetable Fibers.—

Cotton, linen, jute, hemp, China grass, etc. Chemical and physical properties, chemical composition, microscopical study, action of chemicals, acids, alkalies, heat, etc

Technology of Animal Fibers —

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Wool, silk, etc. Chemical and physical properties, chemical composition, microscopical study, action of chemicals, acids, alkalies, heat, etc.

Operations Preliminary to Dyeing.—Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting, silk scouring and bleaching, and action of soaps.

Water and its Application in the Textile Industry.—Impurities present, the methods of their detection, their effect during different operations, and methods for their removal or correction.

Mordants and other Chemical Compounds used in textile coloring not classed as dyestuffs.—Theory of mordants, their chemical properties and their application, aluminum mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, sulphated oil, fixing agents, leveling agents, assistants, etc.

Theories of Dyeing.—Chemical, mechanical, solution, etc.

Natural Coloring Matters.—Origin, properties, application of indigo logwood, catechu or cutch, Brazil wood, cochineal, fustic, turmeric, madder, quercitron bark, Persian berries, etc.

Artificial Coloring Matters.—General discussion of their history, nature, source, methods of manufacture, and methods of classification :

Special study of : Direct cotton colors, basic coloring matters, acid dyestuffs, phthalic anhydride colors, including the eosins, rhodamines, phloxines, etc., and Alizarine colors, including other artificial coloring matters requiring a metallic mordant.

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Machinery used in Dyeing.—A certain amount of time is devoted to the description of the machinery used in the various processes of textile coloring, supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

The course of practical work in textile chemistry and dying requires at least fifteen hours of practical laboratory work each week. By the performance of careful and systematic experiments the student learns the nature of the various dyestuffs and mordants, their coloring properties, their action under various circumstances, and the conditions under which they give the best results. The more representative dyestuffs of each class are applied to cotton, wool, and silk, and the student is then required to

enter in an especially arranged sample book a specimen of each of his dye trials with full particulars as to conditions of experiment, percentage of compounds used, time, temperature of dye bath, etc.

For convenience and economy, most of the dye trials are made upon small skeins or swatches of the required material, but from time to time larger quantities are dyed. By the use of a small printing machine the principles of calico printing are illustrated, and by the introduction of small dye machines, vats, etc., the practical side of the subject is studied, and it is the constant endeavor of those in charge, to impart such information of a theoretical and scientific character as is usually difficult to obtain in a dyehouse.

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The work in the dyeing laboratory is supplemented by trips to a number of the large dye houses and print works in the vicinity, and in this way the student is given an opportunity of seeing the various operations carried out on the large scale. During the third year, the subject is reviewed with the introduction of many advanced topics, such as dye testing, calico printing, comparative dye trials and numerous problems that arise in the dye-house.

Organic Chemistry is introduced during the latter part of the first year in general chemistry, but is continued as a special subject during the whole of the second year. The study is taken up in a thorough manner, and by the end of the year the student will understand the composition of the important artificial dye stuffs, and the equations representing the reactions involved in their manufacture.

The whole subject of inorganic chemistry is reviewed during the second year, and many advanced topics introduced which were necessarily omitted from the first year course in General Chemistry.

Industrial Chemistry is taken up during the second and third years, particular attention being paid to those branches of special interest to the textile chemist, as oils, soaps, the gas and coal tar industry, building materials, and the manufacture of the important chemical compounds, acids, alkalies, bleaching powder, various mordants, etc., on the large scale. Each student is required to manufacture in the industrial laboratory a number of chemicals, starting with the raw material used in the chemical works and obtaining a finished product which shall stand the various tests of purity. The course is illustrated as far as possible with experiments, specimens, diagrams, and charts,

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and the students are given an opportunity of visiting some of the industrial establishments in the vicinity of Lowell and Boston.

The subject of Quantitative analysis also extends through the second and third years of the course.

The second year work consists of a thorough training in the general principles of analytical work, the ground covered being practically that found in "Talbot's Quantitative Analysis." Each student is assigned a desk in the laboratory for his sole use, and is required to perform a large number of analyses independently.

The third year work is designed to give the student sufficient experience to allow him to deal intelligently with technical problems. The laboratory work will consist of the analysis of such substances as lubricating oils, alkalies, soaps,

coal, water, bleaching powder, lime, etc.

Microscopy is taken up in the third year, the work including instruction in the use of the microscope, examination and detection of various fibres, and the preparation of slides.

Upon completion of this course, each student is required to present a thesis and do a certain amount of original work on some subject appropriate to this department. When this thesis has been accepted by the head of the department, and examinations successfully passed in all required subjects, the student is entitled to the regular school diploma.

The work already described is that given in the regular chemistry and dyeing course, but every student taking one of the other regular courses is obliged to devote a year

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to general chemistry, and take a course of lectures upon the subject of textile chemistry and dyeing, before he can receive a diploma. The necessity of this measure is sometimes questioned by students entering the school, and a few explanatory words may make clear its advisability.

It is safe to say that eight out of every ten students entering the Textile School, have no definite position to fill when they graduate, but every one of them is ambitious to become at some future time the head of the concern with which he may be connected. If he has taken the cotton course he may have a position offered to him in a corporation with which a print works or large dye house is connected, or, if he has graduated from the woolen and worsted department he may begin work in a mill running a dyeing and finishing plant.

If he has not studied textile chemistry and dyeing, he will in

all probabilities be wholly at sea when he enters the dye house, while the man entering the mill a year or two later with a knowledge of these subjects, can by observation and reference to his note and text books, become familiar with the different coloring and finishing processes, and for this reason alone may out-strip the former in the contest for success.

The evening course in the department extends through a period of three years, the school being opened four nights a week, as much of the work already described is selected as can be taken in the allotted time.

The department is in charge of Louis A. Olney, A. C., of the Lehigh University, previously an instructor in organic and textile chemistry at Brown University, ably assisted by G. Carl Spencer, S. B., of the Worcester Polytechnic Institute, Philip R. French, S. B., of the Mass. Institute of Technology and Walter F. Haskell, B. A., of Bowdoin College.

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Advertisements must be at the Journal Office before the
fifteenth of each month for insertion that month.

Contributions may be sent to Editor of The Lowell Textile
Journal, and will receive prompt attention.

EDITORIAL.

It is now three years since the Lowell Textile Journal made its first visit to the manufacturers and mill men of the United States and Canada, and to the students of the Lowell Textile School.

It has been improving as the time has been quickly flying and today, it is acknowledged by prac-

tical mill men to be a desirable little journal.

Its success has not been phenomenal from a pecuniary standpoint, but it is gradually pushing its way towards the front, and it is a welcome visitor in many of the reputable mills established all over the United States and Canada.

Its list of contributors and correspondents, now ranking among the best practical men in the country, and whose articles are alike instructive to the employer and employee, will be increased from time to time as circumstances will permit.

The design department will be a permanent feature, giving the latest novelties with explanations as received from abroad from month to month.

Each issue will also contain a query and reply department for those of its readers desiring to make use of such.

We shall aim to make it as heretofore promised, a helpmeet to the

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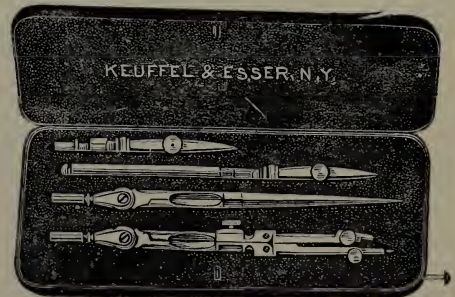
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We do not head this column with a long row of bold-face figures and claim them to represent our regular circulation, we think too much of our honor as men, and too much of our reputation as publishers, to make any such showing or statement, neither do we desire to make you think our circulation is already up to the thousands; but we do wish to present the case to you just as it is.

During the past twelve months we have sent a sample copy of the Lowell Textile Journal to every woolen, worsted and cotton mill in the United States and Canada, besides to many carpet and silk mills, from which circulation we received many subscribers, most of them managers, superintendents and loomfixers.

Our circulation during the past

years was 32,000 copies, and with our advertising rates as low as it is possible for them to be, are we not entitled to a share of your patronage?

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For the loyal support accorded by our advertisers and subscribers and the intelligent class of contributors scattered over the country, we feel profoundly grateful and more deeply obliged than ever to faithfully represent the interests of all those who have taken such a deep interest in us.

..

The Merchants' and Manufacturers' Fair held in the Mechanics' Building, Boston, has been a stupendous failure from a manufacturer's standpoint; but for the candy dealer, the blacking, stove polish, salted peanuts merchants, penny in the slot, gypsy camp and fortune teller, it certainly has been

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During the Exhibition, the Textile Journal Company has distributed into good hands over twenty thousand copies of the Journal.

...

Again, we call upon the students of the Lowell Textile School, day and evening, to assist in making the Journal a big success.

We ask you be loyal to the school, be loyal to each other, and be loyal

to those who help you along in your arduous studies.

...

Patronize our advertisers, they are doing all in their power to forward the interests of the School, and it is our duty to give in return our patronage to such liberal advertisers.

AT THE FAIR.

The following persons went to the Mechanics' Fair in Boston, Oct. 20, 1900:

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"He handed in his resignation as a bluff to make them raise his salary."

"And did they raise it?" "Yes. But another man's drawing it."

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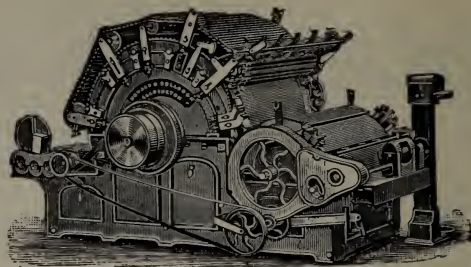
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after, will last 7 years at the least, and give satisfactory results.

THE USE OF THE JACQUARD.
The actual use of the Jacquard is to make a figured fabric, which is beyond the range of harness shafts; but it is often used to produce cloths that can be made on a small number of harness.

In some mills this is not recognized, but this is a fact, and what is to hinder it from being done?

There is a Jacquard that has run out its order on figured goods, and the warp is such as can be used on a twill cloth order, drilllet, etc.; what is the use of letting that machine be idle, or changing the warp for another order, causing loss of yarn? The Jacquard can weave such goods if rightly constructed.

By the use of a little judgment, a fine harness can be used for a coarser grade of goods rather than tie up other harness, if it is but a small order; but the slip comber-board is an essential element in such case; so that in using a coarser reed the harness can be widened out to prevent the chafing of the yarn in the reed, also by the use of what is termed "casting out," for example:

Supposing you have a machine of 400 hook capacity and the design calls for less than 400 ends, say 384; then 16 ends from each 400, or each repeat of the pattern would be cast out and the harness left empty, then that machine could be used just the same as if the 400 hooks were used; for if the design is made correctly the last end will

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EGYPTIAN COTTON, Etc.

join on to the first, so however many are cast out.

It is possible to cast out 80: that gives a wide range in changing over from a fine to a coarser cloth.

As the foregoing will show, the capacity of the Jacquard for producing figured cloths is unlimited; from the common figures for the China market to damasks, quiltings, table cloths, cotton dress goods, figured cretonnes, lenos, either striped or all-over effects, woolen and worsted dress goods, tapestries, carpets of every descriptions and silk goods; the latter including veritable works of art; such as the one woven at the Arlington Mills, Lawrence, "Columbus sighting America," which took over 21,000 cards to form the pattern

The Continental Mills, Lewiston, Me., have also a fine picture in silk of their mill. In one corner of the picture they show a figure of the "Minute Man"; but a finer

picture still is the one called "Crossing the Ford."

To form an idea of what even an ordinary machine can do, that is aside from the fine index Jacquards, notice the following: A pattern of 752 ends had to be woven, this to be reeded 44 reed 3 in a dent, 132 per inch; an 800-hook machine was used, which is the largest ordinary index machine that is made. It was a double action machine and had actually four distinct cylinders, two working together. There was only one frame for the 800 hooks, but this was braced up in the middle. This was more compact and occupied less space than if two 400 machines had been used.

Again, an extra warp figured cloth had to be woven, the figure requiring 600 ends; a 600 machine was used, the harness was tied up to a 30-reed 3, and to form the ground of the cloth extra cotton

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harness were used, the spare hooks on the machine being used to lift the cotton harness.

It is quite common to add extra harness to the back and front of the comber-board and make an ordinary Jacquard weave leno stripes, etc., and the full extent of this article could be used in describing cloths made by the use of additional harness, or through combining two or more machines together, but the foregoing will give an idea of what can be done.

Card Cutters. It would be useless to attempt to describe these machines in the space allowed, and the reader can form some idea of the latest machine by looking at the cuts in the advertisements in the Textile School Journal.

I know it is of interest to me to examine closely the cuts shown, as they gave an idea of the advance of machinery.

Suffice to say, the up-to-date mill will have dispensed, or is intending to dispense with the use of the old roller plate card cutter, that is for the first set of cards, and will add the piano card cutter, which is far ahead of the old plate on which each punch had to be changed separately, also for the cutting of more sets of cards for the same design a "Power Repeater" will be used. This is a machine that works somewhat on the principle of the Jacquard machine; the original set of cards working over a cylinder and having effect on needles that control the cutting punches under which pass the blank cards.

"It seems that they have flower days at the summer kindergartens," remarked the observant boarder.

"Every day is flour day at the bakery," added the cross-eyed boarder, irrelevantly. — Pittsburgh Chronical-Telegraph.

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Over twenty-five years experience in the business.

Boys' Hair Cutting, 15 cts

CURTIN'S, - - - 36 Central Street.*THE ROUNDERS.*

On Saturday evening, October 13th, the "Rounders" were out for a good time, and by all information received, they had a jovial night.

On the evening named, about a score of the Textile Rounders met at the front entrance of the Textile School on Merrimack street, and under the command of chief marshal "Six-foot two," the Rounders were graded according to size from a Craig to a Groove. As they stood in line on the curbstone, the signal was given to move-on by City Officer in blue. The procession started in single file, having the appearance of this **○○○○○○**. The march was long and tedious, and after crossing the bridge into Centralville, the Rounders formed into a Seranading Discord Band, each whistling a different tune. The attempt was made to augment

the Rounders by drawing some Night Hawks from Bridge and 3rd streets. The effort was a failure, so the procession counter-marched down Bridge to Central Street Drug Corner where it was reviewed by a large number of pretty damsels who appreciated the successful efforts of the Rounders to give an evening's free entertainment. The aforesaid City Official in Blue appeared a second time and dismissed the first Saturday Night Rounders.

"Aim high," cried the clerical visitor, as he endeavored to rouse the moral ambition of the bright-faced Sunday school lads and lassies before him. "Aim high!"

"Not much," interrupted a small boy on the front bench: "that's what th' Spaniards did, an' see what happened to them!"—Cleveland Plain Dealer.

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EXCHANGES.

We take this opportunity to acknowledge the following Exchanges: The Thistle, The Vidette, Lynn H. S. Gazette, Lynn English H. S. Recorder, The Tech, The Blotter, Aggie Life, The Crucible, The Lowell H. S. Review, The Panorama, Res. Academical, Somerville Radiator.

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BY CHARLES G. PETZOLD.

A Text Book for designers, overseers, loom-fixers, web drawers, weavers and others who are interested in the construction of cloth. On receipt of 25 cents, a copy of Parts I and II will be mailed to any address in the United States and Canada. The work is richly illustrated, and the rules for construction of weaves clearly explained. It will consist of two hundred and eighty pages, and about 24 plates of art weaving, and is to be published monthly in twelve parts.

CHARLES G. PETZOLD.

37 Whitman Street, - - - - - Lawrence, Mass.



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The other day a little boy was sent to a shop for a penny's worth of cobbler's wax, says London Spare Moments.

The shopman, thinking of quizzing him, said:

"Won't shoemaker's wax do?"

"Aw doan't know," replied the lad. "Aw'll go an' see."

He returned again directly and, addressing the shoeman, said:

"Mi father says that shoemaker's will do."

The shopman handed it to him, smiling, and said:

"What is the difference?"

"Well," said the lad, going toward the door, "mi father says

ther' same difference as ther' is between you and a donkey, and that is, they're both alike."

And then he was off like a shot.

Schoolmaster—Why was it that his great discovery was not properly appreciated until long after Columbus was dead?

Nineteenth Century Schoolboy—It was because he didn't advertise, sir.

A class was being examined in spelling the other day, when the teacher questioned a little girl as follows: "Ethel, spell kitten." "K, double i, double t, e-en," replied Ethel. "Kitten has two i's then, has it?" "Yes, ma'am," answered Ethel, confidently; "ours has."

WM. E. BASS & CO.,

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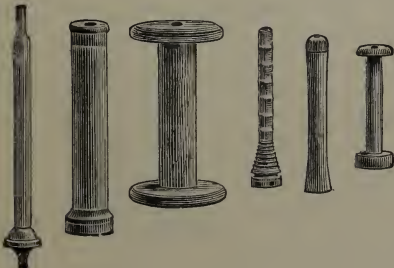
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73 Middle Street. - Lowell, Mass.

THE ADMIRABLE AMERICAN AND THE BEERY BRITON.

In a very readable book on "America's Working People," (London: Longmans), the author, Mr. Spohr, sketches (among other matters) the industrial conditions prevailing in the old and new factory towns of New England. Like many other writers on such topics, however, his statements are not according to knowledge. For example, with reference to the relative efficiency of English and American labor Mr. Spohr remarks that the only cheap labor which he found to be dreaded was that of the South. "The one manufacturer who did talk with me about English labor put in the strongest kind of terms its inferiority. 'An American weaver,' he said, 'can handle eight looms where an English weaver handles four.' I told him that some

Scotch and English weavers I had talked with had said that there was just that difference between the work they did in the old country and here, and I asked him how he accounted for it. 'The English workman is too beer-soaked to look after more than four looms.' Be the explanation what it may, there is no doubt about the facts. American weavers turn out nearly twice as much work per day as their English competitors, and their wage per piece is absolutely a little less." The facts declared in the last sentence are possibly substantially true; but the statement that the English weaver is too "beer-soaked" to look after more than four looms is a grotesque libel. Moreover, it implies the equally erroneous assumption that English weavers are men—not, as is actually the case, mostly women and girls. English weavers, girls, women and men, to-

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Lawrence, Mass.

gether with their employers, have no doubt much to learn from their American cousins; but when Mr. Spohr tells us that they are too beer-soaked to look after more than four looms, he is talking on the same loose lines as his fellow-countryman, the Rev. Charles Sheldon, who, on the occasion of a recent visit to London, declared that he had continually to step off the footway, to make room for drunken soldiers.—*Textile Mercury*.

Among the awards at the Welsh National Eistedfod, opened on Tuesday in Liverpool, were prizes for the following: Portiere or screen, embroidered in silk, Miss Johnson Jones, Holywell. Dining table centre, with six d'oyleys embroidered (natural flowers), portion of the prize awarded to Mrs. Robert Hand, Liverpool. Linen bedspread embroidered with threads in fancy

stitches, Miss Emma Jones, Menai Bridge. Cushion embroidered in crewel wools, Miss Johnson Jones. Specimen of Welsh made tweed or cloth made entirely from Welsh wool, Mr. John Jones, Factories, Brynkir. Specimen of Welsh flannel, Mr. John Humphreys, Newtown.

JOHNNY'S LITTLE JOKE.

Johnny—Say, ma, hadn't the teacher ought to set a good example for the children?

Mother—Why, yes, of course she should.

Johnny—Well, this arithmetic example is the worst I ever saw.

"Does your wife take to horticulture, Billy?"

"Yes, indeed; she gets out every nice day with the hoe and chops the head off something I've planted."



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MANUFACTURES AND LIBERAL ARTS BUILDINGS FOR THE PAN-AMERICAN EXPOSITION, 1901.

THE ELECTRIC TOWER.

The dignified and stately beauty of the great Electric Tower, which will form the conspicuous centerpiece of the Pan-American Exposition at Buffalo next year, will



command the rapt admiration of every visitor. The genius of the architect has been taxed to preserve lines and elements of beauty in a work of such tall proportions, but the problem has been well mastered.

The height of the tower is 375

feet above the surface of the broad basin in which it stands. Its position is between the Court of the Fountains and the Plaza, on the north side of the Mall. It looks down upon the Agriculture Building at the east and the Electricity Building on the west. The tower proper is flanked on the east and west by long curved colonnades, which sweep to the southward and terminate in airy pavilions, forming a semi-circular space 200 ft. across. Within this space and in a high niche in the main body of the tower are cascades, while all about the basin are leaping jets and countless playful figures, each with its spurt of water combining to make a brilliant water scene. At the center of the niche is a tall geyser fountain, whose waters find their way from the high basin within the niche over successive ledges and among a multitude of vases to the level of the pool.

The main body of the tower is eighty feet square. From the surface of the water to the top of the colonnades is seventy-five feet. This portion of the structure is enriched

by a system of decorative rusticated bands, which give an aspect of great solidity to the base. The shaft of the tower is treated with great simplicity. The center of each side is paneled with fantastically perforated work, through which is indistinctly revealed the massive framework of the tower. This feature is calculated to produce a remarkable effect when lighted from within, as it is the intention to do. The main shaft of the tower terminates in an elaborate entablature at the height of 200 feet. The crown of the tower rests upon this entablature, and is composed of three stories of diminishing proportions and varying design. The lower of these stories is an arcaded loggia, rich in ornamentation and having the wall surfaces brilliantly colored. Paviliones at the corners terminate in light fantastic cupolas. The second stage, or lantern of the tower crown, is in the form of a high, circular colonnade, entirely open, so as to allow the effect of the sky to be seen between the columns. A spiral staircase within the colonnade leads to the last stage of the tower, the cupola, over whose soaring dome is poised the superb figure of the Goddess of Light, in hammered brass, thus dominating the entire exposition, which owes so much to her generously exerted power.

The entrance to the tower is across an ornamented bridge from the Plaza, on the north side. Elevators will carry passengers to the various floors, which will be devoted to different purposes of the exposition, such as reception rooms, offices, restaurants, belvederes and amusement halls. A large restaurant and roof garden, at a height of 200 feet, will give the diner a broad and beautiful view of the exposition and the surrounding landscape. From the cupola the eye can sweep the whole Niagara frontier, and look far into Canada, beyond the majestic river that separates that country from the States.

Sculpture plays an important part in the decoration of the tower. Two magnificent monumental groups of statuary flank each of the four sides of the base. Above the water niche in the southern face of the tower is a magnificent escutcheon, representing the arms and seal of the United States. In the spandrel of the arch above the niche are sculptures in high relief. The pavilions and wings are also richly decorated with sculptures and other architectural devices. The entire exterior of the tower will be studded with myriads of electric lights, so arranged that a great variety of effects can be secured. The use of electric lights

in combination with the sparkling fountains and cascades, will produce scenes of fantastic beauty.

ELECTRICITY BUILDING.

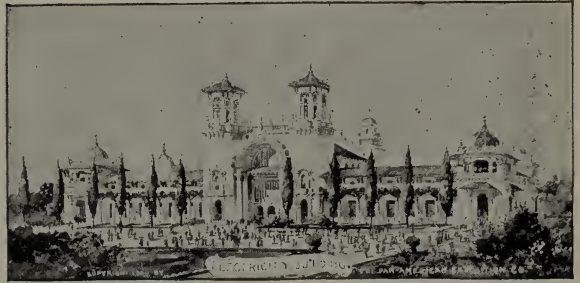
Elaborate designs have recently been completed for the Electricity Building for the Pan-American Exposition, to be held in Buffalo, N. Y., May 1st to November 1st, 1901. Displays of all kinds in the practical and artistic uses of electricity, together with complete exhibits of electrical machinery and appliances, are to be conspicuous features of the great exposition.

The designs contemplate a very handsome and commodious building. The structure is to be 500 feet from east to west, and 150 feet wide, giving an exhibition space of 75,000 square feet.

The South Facade fronts the Mall and the north fronts the Midway. The east end is toward the massive Electric Tower, while the west faces the Grand Canal. The building is long, low and inviting. The design of the facades shows artistic grouping. The openings of the pergola-like loggias, placed at frequent intervals, present a delightful effect, showing more and more of the details of the pilasters and openings as the eye travels to

the end of the building farthest away from the observer.

There is a pleasing ending at each corner of the structure, with a low-domed pavilion tower, and the facade is interrupted at the center by a double-towered entrance. This entrance, wide and high, is spanned by an ornamental arch and supported on each side by columns. The towers, also,



have minor entrances through them.

The connecting work between the towers, the towers themselves, the pavilions at the corners of the building, and similar places, are to be brilliantly illuminated and made gay with banners and flags.

The modelled relief work of the building is of the choicest design. The general ornamentation of the structure is to be frescoes in an interesting mixture of reds, greens and yellows. The general color scheme follows that of the Machinery and Transportation Building and other groups of buildings of the exposition. The structure

was designed by Green & Wicks of Buffalo.

MACHINERY AND TRANSPORTATION BUILDING.

One of the big buildings of the Exposition will be that devoted to Machinery and Transportation. This will be 500 by 350 feet, with a central court 100 by 175 feet. Its location is on the west side of

tural feature, and each corner flanked with low pavilions, the design giving large plain surfaces for color, while the eaves give deep shadows. The loggias, balconies, pavilions and other places are to be ornamented with shrubs, vines and flowers, blending with the coloring of the building. The openings are grilled with specimens of wrought-iron "rejas" or grill screens, such as are seen in examples of Spanish architecture of the sixteenth century.

The building has numerous entrances, the principal ones being in the center of the four facades. Once inside the structure, the size will be appreciated.

All the towers, pavilions and other proper spaces are to be brilliantly illuminated and made gay with banners and flags.



the main group, opposite the Court of the Fountains. It is built in the type—as all the other principal buildings are—of the Spanish Renaissance, modified to suit the conditions of the Exposition. The work is far more ornate, however, with roofs laid with red tile and the cemented walls brilliant with color. The colors are to be of reds and yellows in light tints. The facades will present an arcaded effect, with broad overhanging eaves, in imitation of the old mission buildings found in California and Mexico. Each facade will be broken by an important architec-

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LOWELL, MASS.

Lowell Textile Journal

HISTORIC STUDIES IN HOME FURNISHING.

TAPESTRIES AND OTHER TEXTILES.

By MARGARET AINSLEE.

By Permission of the Philadelphia Inquirer. Copyright by Seymour Eaton.

Of all the textile fabrics, tapestry, ancient of arts, forms the most poetic of hangings, the most romantic of backgrounds, the most artistic simulation of the painter's handicraft. The difficulty of understanding the technicalities of this noblest of the weaving arts is simplified by its classification into "high warp" and "low warp" tapestries. As it is manufactured upon the warp of wool, thread, cotton or silk, the weft is worked in with short lengths of the desired color and shading. The loom is formed of two cylinders or uprights, around one of which the warp is rolled and around the other the web. The uprights are placed vertically in "high warp" and are parallel with the ground in "low warp." That the high-warp method, similar to that used by the carpet weavers of the east, was known to the nations of antiquity is proved not only in the pages of Homer, where Helen is thus pictured as weaving tapestry

when visited by Venus during the siege of Troy, but also by the designs on the old Greek vases, in one of which, from Chinsi, Penelope is represented as weaving beautiful hangings upon a "high warp" loom. Also in Ovid's "Metamorphoses" there is a description of the weaving combat between Pallas and Arachne, in which the methods employed correspond exactly to those used by the Gobelins in making their largest and most important tapestries.

Tapestry weaving takes greater expertness and more years of training on the part of the workman than any other branch of textile manufacture. So much depends upon the weaver's taste and judgment in the selection, juxtaposition and harmonizing of the shades and tones to be used that he must needs have the instincts of an artist in order to produce a satisfactory copy of the cartoon or working model. An unsympathetic workman, laboring

under the disadvantage of operating from the wrong side of his picture, is not likely to produce the desired transparency of the usual minute hatching and stippling of colors, and his work, consequently, presents a harsh and mosaic-like appearance. This effect is especially to be avoided in the execution of "storied" tapestry, which is woven directly from a cartoon designed with special reference to the limitations of the weaver. Some idea of the bewildering infinite gradations of color forming the palette of the loom-worker may be gathered from the fact that the late director of the dyeing departments of the Gobelin factories composed a chromatic prism of 14,420 different tones. The best wool used in the European tapestry works has always been imported from Kent in England.

It was in the East, the cradle of decorative craftsmanship, that the art of tapestry weaving sprang into being; and in spite of the political and artistic fluctuations which so strongly influenced the other arts, the oriental influence upon tapestry design remained through many centuries persistent in Europe. This was undoubtedly due to the skill with which the old world craftsmen adapted design to technical necessity and yet achieved effects instinct with natural life and subdued overflowing splendor of color. Textile fabrics reached their highest development under the Saracens of Egypt, who taught their arts to the subject Sicilians. When the Norman King of Sicily took Corinth and Argos he imported many weavers from Greece to Sicily, where they quickly assimilated

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the Sicilian style, and many of the finest examples of Siculo Saracenic fabrics belong to this period. The Crusades also modified the decorative arts and caused the introduction of heraldic badges and armorial bearings into the designs of the beautiful Sicilian textiles.

During the fourteenth and fifteenth centuries Bruges and Antwerp were the greatest ports in the world, and it was but natural that Flanders should take the lead in exporting industries which would extend her commerce. Consequently the earliest tapestries woven in Europe were the Flemish, made toward the end of the twelfth century at Arras, Oudersarde, Brussels, Valenciennes and Bruges. This product of the Flemish looms was exported to all parts of Europe, and in excellence of workmanship and flat treatment of decorative subjects has never been surpassed.

Arras, because of its pre-eminence in the manufacture of storied weaving, became a synonym in England for tapestry in general and was so understood by Shakespeare when he made Polonius say:

"Behind the Arras I'll convey myself.
To hear the process."

An idea of the various uses of Arras hangings may be gathered from the illustration of the mediæval chateau. Here were hung the favorite local epics, that those who saw might read of their master's valor in the hunt, his prowess in the tournament; or perhaps it was some bible story, some fresco in worsted intended "to point a moral or adorn a tale." The weavers understood thoroughly during the middle ages how to satisfy the soberest principles of decoration by means of correct juxtaposition of tones, sharply defined expressions of countenance and such skillful-

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ness of grouping that the eye might easily embrace the general effect. Many of these pieces are still remarkably decorative and singularly harmonious in character despite the fact that the subject is no longer clearly discernible.

Probably the most beautiful tapestries in existence are those made at Arras from the cartoons of Raphael. Rubens found seven of those cartoons, which Leo X had commissioned Raphael to paint for the decoration of the Sistine chapel, cut into strips for the convenience of workmen and rotting in a woden box in a Brussels shop. Perforated by the needle of the copier, stuck to coarse brown paper,

water-stained and faded, there was still enough left of the scenes from the Acts of the Apostles to enable the genius of one artist to recognize the master genius of another. Rubens, therefore, induced Charles I to buy them for Whitehall; Cromwell afterward purchased them, and after many vicissitudes, they are now in the South Kensington museum, through the courtesy of Queen Victoria. The tapestries from these cartoons were woven in a tissue of yarn, silk and gold, and reached Rome a few months before the death of the artist who had designed them. After many wanderings these tapestries are now in the Vatican, but are less valuable than

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Belting, Curriers' and Roll Coverers' Machinery.**194 Western Ave., Lowell, Mass.**

the cartoons from which they were worked.

Four splendid cartoons by Raphael's pupil, Giulio Romana, found their way into France, whither they had been sold as rubbish and where they are now greatly treasured, one of them having been copied by the Gobelins in the reign of Louis XIV. It is supposed that some of the original tapestries from these cartoons were burned for their golden borders.

When Louis XI, of France, took the town of Arras it was practically the death blow to the tapestry-weaving industry of this far-famed little place, and Brussels, under the Burgundian rule, soon became the centre of Flemish weaving. The most extensive collection of Flemish tapestries in existence is now in Madrid, acquired during the Spanish occupation of Flanders.

It was Francis I, the French delegate to the far-famed Field of

the Cloth of Gold, who first conceived the idea of meeting the immense demands for the enrichment of his royal palaces by uniting at one centre at Fontainebleau both the fabrication and the designing of tapestry. Henry IV also protected the industry, removing the manufactory from one place to another until it finally settled down at the Gobelins. This place Louis XIV bought thirty years later, uniting there all the principal industrial centres for dyeing, embroidery, tapestry, jewelry, iron-work, cabinet-making and engraving, under the name of the Royal Upholstery Works.

The Gobelin brothers had in the reign of Francis I introduced into Paris from Venice the art of dyeing scarlet, an enterprise then considered so impractical that it was known as the Gobelin folly, yet which became, notwithstanding contemporary scorn, most success-

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ful. Their larger pieces of tapestry today command fabulous prices, because of their world-famous brilliancy, consummate technique and fine texture, many of the oldest pieces still being in excellent condition despite the mellowing of their tints through age. Colbert, minister to Louis XIV, also ordered of them the manufacture of a low-warp tapestry suitable for furniture in which they became exceptionally successful.

To be continued.

A "ROUND UP" OF THE ROUNDERS.

On Hallowe'een the Rounders made their appearance to greet the Republicans who were on parade, and created quite a sensation among

the onlookers by the enormous canes which they carried. All the students who had engagements (at street corners) which prevented their being at "the ranch" when the "round up" occurred, were "corralled" by them, and with full ranks and "colors up," the Rounders proceeded to let the impatient multitude know that the "Textile Boys" were out. After viewing the parade in Merrimack street, they marched to Centralville where they again viewed the parade, which they greeted with vociferous school yells.

On election night they joined in the general wave of political agitation which prevailed in Lowell (and elsewhere). They met at the school, and with canes carried at rest, and school flags flaunting in the air, escorted Professor Umpleby, who

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had just finished an arduous night at the school, as a guest of honor through the vast throng in Merrimack square, to a place where he could get the election returns. The square rang again and again with the familiar Textile yell and after cheering Professor Umpleby, they proceeded to the Savoy Theatre, where a few stragglers were captured.

A hurried consultation was then held, which resulted in the unanimous opinion that Mr. Burnham's painful efforts to raise a Vandyke did not meet the approval of the organization, and a delegation was appointed, in his temporary absence, to locate a barber willing to perform the operation. The unsuspecting victim, linked arm in arm with the two "wool giants," was led to the operating room. "The chemist" made a grand struggle, but the odds were against him, and

he was placed in the chair. His pleadings finally touched the heart of the surgeon (barber), who yielded to the victim's entreaties and declined to perform the operation.

This little episode having ended the Rounders then went to Merrimack square to view the returns, which were displayed by the several newspapers, and not being partisan, yelled for both parties, although the cheer for the Republican candidates were reported to have been the louder. The school yell was not forgotten in the excitement, and was often heard when there was a lull in the returns. The Rounders soon perceiving the way the election was tending marched in single file to the Republican headquarters. Here a call for refreshments was made, as the continued marching and cheering during the evening had well digested their suppers. As no ladies

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could be found, they retired in the same order to a convenient restaurant where no time was lost looking over the bill of fare. They held sway here the best part of an hour, and then feeling able to perform ample justice to the work before them, formed a sound money parade and marched to the City Hall, on the steps of which an opportunity was given for each student to express his views on the result of the election. While Mr. Bennett was in the midst of a fervid oration, the helmet of a guardian of the peace was seen at the door, and Mr. Bennett politely yielded the floor to him at the earnest request of the Rounders. The officer declined this great honor, and the lights in front of the building having been suddenly extinguished, it was impossible to continue the

meeting and it was then decided to carry the tidings of the election to absent Rounders.

Turning their faces towards Belvidere they serenaded "young man tailor," but their efforts met with no response. It was later learned that the "serenaded" were complimented by the landlady on their good judgment in not responding. From Belvidere the line of march was taken to Centralville where several calls were made, the most important being upon Professor Umpleby, who appeared at the window robed in white, and informed the merry-makers that he "would be down in a minute." Upon his reappearance, in different garb, the Professor made a short address containing good advice, and finished by advising the boys to retire as it was time for them to be in

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Lowell, Mass.

bed. Acting upon this very good advice they started to make their last call, accompanied by the rumble of milk teams. This was suddenly interrupted by the clanging of the fire alarm, the line of march was broken and a general stampede ensued. As the blaze was limited to an ash barrel, their wishes to witness a fire were not gratified, and upon arriving at Merrimack square, the line was reviewed and dismissed by the returning firemen.

TWO HEADS ARE BETTER THAN ONE

METHODS OF COST FINDING.

We have received from M. G. Wight & Co., Lowell, Mass., a copy of "Methods of Cost Finding in Cotton Mills," by Wm. G. Nichols. This is the only book that we know of which gives a thorough description of the various methods of cost

finding in the numerous departments of the cotton trade.

The work is thorough and comprehensive, covering all departments of the cotton factory, including maintenance, protection and power, and detail work of the various operations, viz: Picking, card-waste picking, br. carding, fin. carding, railway heads, drawing, slubbing, intermediates, fly frames, revolving flat cards, jack frames, mule spinning, warpers, twistors, beamers, slashers, chain quillers, cone winders, reels, looms (plain and fancy), yarn dyeing, stock dyeing, finishing gingham, flannels, blankets and gray cloth, power, light, repairs, moisture, etc.

We have no hesitation in recommending this very valuable book to every person interested in textile calculations, and every textile student should add this work to his library.

D. H. WILSON & CO.,

Coppersmiths, Plumbers, Steam and Gas Fitters, Sanitary Engineers.

Manufacturers of Slasher Cylinders, Silk and Dresser Cylinders, Color and Dye Kettles. All kinds of copper work for mills. All work warranted satisfactory.

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AT MILL PRICES. Send for Samples.

BROWN & ACKROYD,

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..

LAWRENCE, MASS.

DO THE BEST YOU CAN.

A young lawyer once complained to a member of the same profession who was a very successful practitioner, that the profession was crowded, and that there was but little chance for a young man like himself, whereupon the old and wise lawyer gave the young man a little advice. He said: "Young man, that the lower stratum of the profession is crowded there is no doubt, and it always will be; but as in all kinds of business, so in ours—there is plenty of room at the top. Get out of the lower ranks and come up higher, and you will not be crowded." While these are not the exact words of the wise doctor, they convey the idea actually expressed, and teach a lesson to laborers or professional men. Did you never notice in an orchard the finest apples, cherries and peaches are always at the very top of the

tree, and that they are not crowded, and have plenty of room to grow, and plenty of air and sunshine and dew and rain to assist in their development? Do you not know that the upper rooms of a house are the healthiest to live in, because of the pure air and sunshine? But you will notice they are almost always unoccupied, because, we suppose, it is too much like work to climb the stairs.

There are some operatives who are never idle. They always have employment and get good wages, and it is just because they have climbed the stairs and have thoroughly mastered their business; and not only so, they have mastered themselves, and in addition to being proficient in their respective callings, they have trained themselves to be gentlemen, and have given some attention to business principles. They are known to be sober and industrious and well qualified. Such

W. W. CAREY, MANUFACTURER OF

WOOD RIM PULLEYS, FLY WHEELS,

SHAFTING AND HANGERS WITH RING OILER BOXES.

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men do not have to seek employment, but employers have an eye on them. Such men become foremen and eventually the superintendents.

In the lower positions, representing the majority of the operatives, will be found those who are all the time complaining that their ranks are crowded. They whine that they get no work to do. The trouble is that they have not the ambition to get up into the place where there is room. Do you ask how I can get to the top? Begin with yourself, if you have nothing else, and be a gentleman. Be sober and honest, and when you find some kind of an opening, go right in and do your best. Slight nothing,

and do the best it is in your power to do, and you have made several steps toward the upper room. Too many of the craft are given to frequenting the drinking places, and, while we are willing to accord to every man personal liberty and all that kind of thing, we know that employers are not seeking that class of help, nor in just that locality for foremen or superintendents. Put yourself in the way of employment, and you will not only find it, but it will find you.

Don't study any more than is necessary, for the world's greatest men never established such a precedent.—*H. S. Courier, Haverhill, Mass.*

THE WILSON Cloth Trimming and Inspecting Machine

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Shaw Knit ON
THE
TOE
TRADE MARK.

SHAW STOCKING CO.

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COMMUNICATION.

LOWELL, Nov. 12, 1900.

To the Editor of the Lowell Textile Journal:

DEAR SIR,—I hope you will allow me a little space in your Journal, as I would like to write a little in regard to an article which appeared in your last edition, under the heading of "The Admirable American and the Beery Briton" by the author of "America's Working People." I think it my duty as a Lancashire man to defend our reputation, for the County of Lancashire (or State, as the American

people term it) is the centre of the cotton industry in England, and, it is only in the cotton industry that people run eight looms in this country. In the first place he styles the English weaver the "Beery Briton," and I grant there are a few beery ones, and he must grant there are a few American beery weavers, that is, unless he goes through this country with his eyes shut, so I think he must concede there is no superiority on that question.

Now concerning the ability of the Briton and the American weaver, I think if Mr. Spohr had

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searched into the matter as he should have done, he would have found that the man or woman whom he terms "The Beery Briton" is really his admirable American who has emigrated to this country, and they are the people who get the best average in this country's mills. I think Mr. Spohr has not thought and searched this matter out as he should have done before making such assertions. He might just as well claim that a helper in a machine shop or carpenter shop is just as skilful as the man who has served his time to his trade. The English cotton weaver in almost 98 out of every 100 goes to weaving when he or she is eleven years old, first, as a tender or helper, and as they become competent they get two looms, and then to three looms, and lastly to four looms, whereas in this country a young man or woman, or an old one

either, goes into the weaver room, and in two or three weeks' time he will be placed on a loom, and he begins to produce cloth (of a certain kind). I leave it to the reader, which is the best workman?

BRITON.

The great political campaign is at an end. Once more the American people have placed the Republican party in power. They have shown their confidence in William McKinley and their approval of his administration. Once more the nations of the world have a chance to observe and marvel at the spectacle of nearly half the voters of a great country calmly accepting the will of the majority, and quietly resuming the daily routine of life under an administration which they honestly and heartily opposed.—*The Thistle, Leominster, Mass.*

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HOLIDAY GOODS OF ALL KINDS.

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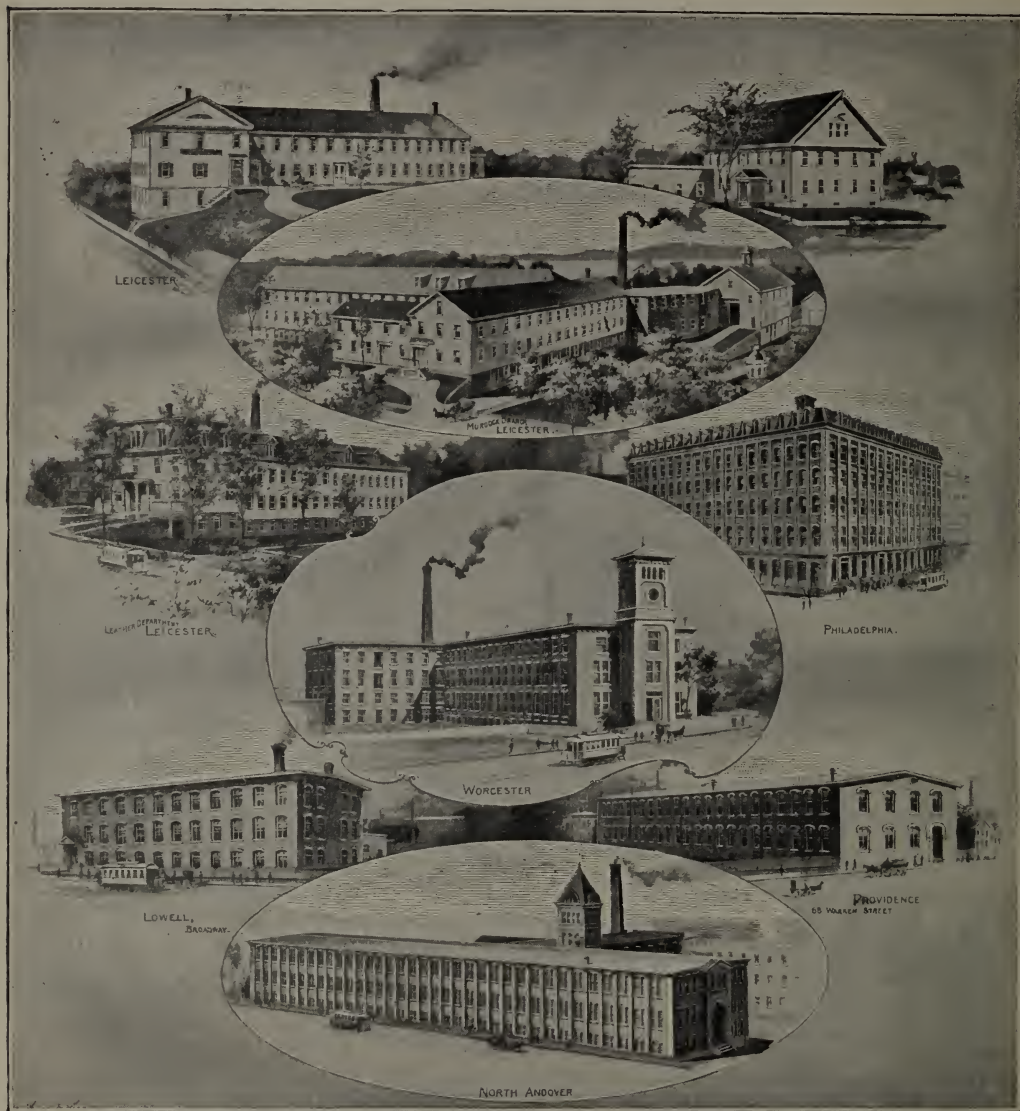
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A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.
Sub Editor, Secretary and Treasurer.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, = Lowell, Mass.

BY

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Advertisements must be at the Journal Office before the
fifteenth of each month for insertion that month.

Contributions may be sent to Editor of The Lowell Textile
Journal, and will receive prompt attention.

EDITORIAL.

A merry Xmas to all.

...

To our advertisers and subscribers we again extend our thanks, and rest assured that we shall do our utmost to further your interests. We respectfully request the renewal of your subscription by remitting one dollar for another year.

Wm. McKinley re-elected President of the United States of America,—the long agony is over; the colored lights have been extinguished, and the curtain rung down. The country is safe, the world will continue to revolve on its axis, the stars will shine, and the Lowell Textile Journal, as heretofore, continue to make its monthly visits to its readers.

...

It is an urgent necessity that the new school building be pushed to completion.

...

The Lowell Textile (evening) School is overcrowded with students, every department has its full share of pupils. The dyeing and chemistry, woolen and worsted spinning, cotton spinning, mill engineering, and designing and cloth construction departments are each taxed to the utmost limit for space.

...

Hundreds of people never heard of Lowell previous to the establishment of the Textile School.

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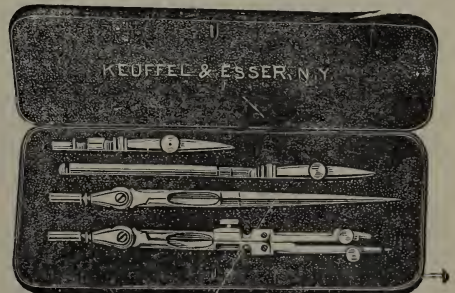
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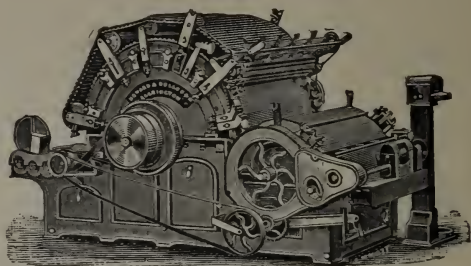
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the merits and you will be convinced beyond a doubt of their superiority.

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There is a beautiful "halo" in the heavens; a halo tinging the cloud of business depression, a rim of bright sunshine to brighten and cheer the heart of the laboring man, to bring content and happiness to the home.

...

Nowadays a man requires a varied ability to be a competent and successful manufacturer. A thorough knowledge of the machinery in each department and how it is constructed is not alone a necessity, but in addition, the power of discerning the seeming trifles that continually present themselves and combine together in working for its success. One of these trifles, which is a power in itself, is *novelty*, or expressed originality in style, and the manufacturers who study this point are the ones

who usually meet with success. Combining taste with ability to use the colors and yarns, novel effects may be secured. Manufacturers who are alive to their interests introduce constantly new and novel styles.

All the ability in the world, how to run a picker, card, mule or loom, will not manufacture a marketable fabric. Manufacturing at the present time is, how to place on the market a suitable article, up-to-date in style, coloring, weave and fabrication, and at such a price as to meet the demands of the public.

To be first in the market with a novelty, is always a point gained.

Competitors with less enterprise wait to see whether a new style pleases; and while they are waiting, the modern manufacturer is doing profitable work.

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Special discounts to
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CARD CLOTHING,
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Lowell is the best city in Massachusetts for a textile college. There is every class of "textile" manufactured in or in the vicinity of the Spindle City.

...

It is our earnest desire that all may have a happy and merry Christmas, and may this seasonable holiday bring material comforts that brighten existence and make life enjoyable and worth living.

...

In this progressive age there still exists a class of old fashioned designers who fancy that those who encourage novelties are their enemies simply because they travel by steam, while they themselves are trying to feel satisfied with the old-mule jog-trot.

...

The condition of the industries throughout the country is much better than was anticipated, the cold seasonable weather has given a stimulous to the textile trades.

The nineteenth century, says a London paper, bequeathed the typewriter in place of the goose-quill, the mowing machine for the scythe, cotton and woolen factories for the hand-loom, the electric lamp for the tallow candle.

What the nineteenth century has bequeathed would fill volumes and we may ask: "How long shall these wonders continue?"

...

The Textile School at Lowell, has an important function to fulfill; it has to educate the people to application of beautiful designs to textile fabrics and other commercial products.

If New England has to maintain her supremacy the above fact must not be overlooked.

Design and fabrication is not a secondary matter, it is of the first importance.

...

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The Textile School is the cause of hundreds of visitors to Lowell.

...

One of our contemporaries asks how our advertising agent mesmerizes the merchants and manufacturers to secure so many valuable advertisements? We answer the question by saying: We guarantee the distribution of the Lowell Textile Journal into the hands of buyers of the various lines of machinery and merchandise advertised. We promise nothing that we cannot live up to. Our circulation for the past year was thirty-two thousand.

...

We have received Number 4 of "Construction and Originating Weaves," by Charles G. Petzold. This work when completed will be a valuable addition to the designers' library. We take this opportunity to call special attention to the ad-

vertisement to be found elsewhere in this Journal.

...

The new building of the Textile School will be one of the most beautiful structures in New England, and Lowell will be proud of its textile school.

...

Advertise in the Lowell Textile Journal. There are four hundred students in the school, the name of your firm will be engraved on the minds of these young men; they are the coming manufacturers and merchants, and it is necessary that they know the makers of every kind of machinery.

The person who refuses to subscribe for his school paper and then reads it over the shoulders of his fellow students, is short enough to tie his shoestrings to his necktie.—
H. S. Panorama, Binghamton, N. Y.

H. E. SARGENT & CO.,
All free High Speed Economic Engines,

Corliss Engines, Cook Water Tanks and Boilers.

 EQUITABLE BUILDING, BOSTON, MASS.

THE Finest Hair Dressing Establishment
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E. W. YOUNG,

Specialist in Hair Dressing,

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FINE HAIR CUTTING and EASY SHAVING

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WEDDING, PARTY AND PHOTO HAIR DRESSING.

Over twenty-five years experience in the business.

Boys' Hair Cutting, 15 cts

CURTIN'S, - - - 36 Central Street.

CLASS 1903.

At the '03 class meeting, held Nov. 18th, a class pin was selected from several designs submitted by the firm of Smith, Patterson & Co., Boston. The pin selected is in the form of a shield which is divided into two parts by a shuttle running diagonally across the pin. The upper corner contains the letters L. T. S. in gold on a maroon field and the lower the figures '03 on a gray field, maroon and gray being the class colors.

A committee composed of Messrs. D. A. and T. E. Ricks and W. A. Arnold, were appointed to visit Mr. L. L. McMullan, our classmate from Georgia, who for the past month has been at the St. John's Hospital. The last report from him is that he is beginning to improve and hopes soon to be able to attend school again.

SCHOOL ITEMS.

We regret that we have only recently heard of the severe and prolonged illness of Mr. McMullan, '03. We are sure that had the fact been known earlier, the boys of the school would have extended their sympathy and best wishes in person.

If the "She-lay-lee Club Rough Houses" are continued, the expressmen will have their hands full transferring trunks.

It is a good thing that pick outs 204x288 are seldom met.

G-t is talented with great vocal powers. He was heard one night, not long ago, in the vicinity of Wentworth avenue singing "I have waited hours, waited long for you." One hour after he was singing, in the same place, "I don't care if you never come back."

THE CRYSTAL CAFE...

Dinner, 11.30 till 3 o'clock. Oysters and Shell Fish.

Orders Cooked a specialty. Lunches of all kinds.

140 Worthen Street.

JAMES W. GRADY, Prop.

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EXCHANGES.

We acknowledge the following exchanges:

Radiator, Somerville, Mass.
Panorama, Binghamton, N. Y.
Blees Monthly, Military Academy, Macon, Mo.
The Thistle, Leominster, Mass.
The High School Folio, Flushing, N. Y.
The High School Recorder, Lynn, Mass.
Gates Index, Neligh, Neb.
Aggie Life, Amherst, Mass.
High School Journal, Wilkesbarre, Pa.
High School Review, Lowell, Mass.
High School Courier, Haverhill, Mass.
Phillips High School Review, Watertown, Mass.
High School Gleaner, Pawtucket, R. I.
The Vidette, York, Pa.
High School Bulletin, Lawrence, Mass.
High School World, Topeka, Kan.
The Normal Pennant, San Jose, Cal.
High School Sentiment, Parsons, Kan.

High School Gazette, Lynn, Mass.
The Distaff, Girls' High School, Boston, Mass.

EXCHANGE CLIPPINGS.

A Suggestion.—If certain pupils would study twice as much as they do, and one-half as much as they should, there would be less occasion for saying "I do not understand it."—*H. S. Journal, Wilkesbarre, Pa.*

You have to pay some people to be good, while others—well, they're good for nothing.—*Blees Military Academy Monthly, Macon, Mo.*

It is always a good thing to have two strings to your beau.—*High School Sentiment, Parsons, Kan.*

CONSTRUCTION AND ORIGINATING OF WEAVES.

BY CHARLES G. PETZOLD.

A Text Book for designers, overseers, loom-fixers, web drawers, weavers and others who are interested in the construction of cloth. On receipt of 25 cents, a copy of Parts I and II will be mailed to any address in the United States and Canada. The work is richly illustrated, and the rules for construction of weaves clearly explained. It will consist of two hundred and eighty pages, and about 24 plates of art weaving, and is to be published monthly in twelve parts.

CHARLES G. PETZOLD.

37 Whitman Street, - - - - - Lawrence, Mass.



PAUL O. KABLE, Assistant.

SUNLIGHT SHOE STORE.

Wear the Orient Shoe,

Best \$3.50 Shoe in the World.

100 Central St., Lowell, Mass.

Teacher—"What is velocity?"

Bright Youth—"Velocity is what a man puts a hot plate down with."
—*Somerville H. S. Radiator.*

A canner, exceedingly canny,
One morning remarked to his granny:
"A canner can can
Anything that he can,
But a canner can't can a can, can he?"
—*H. S. Gazette, Lynn.*

Johnny—Paw, why do they call 'em high schools?

Paw—You'll find out when you become a tax-payer.—*H. S. Folio, Flushing, N. Y.*

John D. Rockefeller has given \$100,000 to the psychological laboratory of Columbia University.—*Aggie Life, Amherst.*

Set yourself earnestly to see what you were made to do, and then set yourself earnestly to do it; and the loftier your purpose is, the more sure you will be to make the world richer with every enrichment of yourself.—*The Distaff, Boston.*

A system of registration lately adopted will be a great help to the teachers if strictly observed by the pupils. Absence books have been placed in each room, and every pupil leaving his room is to write in these books his name, where he is going, and the time when he leaves. Every pupil who is tardy instead of bringing an excuse, registers in the library before going to his room.—*H. S. Gleaner, Pawtucket, R. I.*

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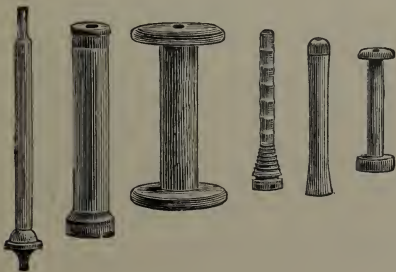
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Of course you're tired of working;
You were tired before you'd begun;
But the groans you give
Won't help you live,
So you'd better change your song.

—*The Normal Pennant, San Jose, Cal.*

It's a good plan to develop a faculty for work, but to be shy about working the faculty.—*Gates Index, Neligh, Neb.*

Don't read the Recorder over your chum's shoulder, buy it yourself.—*English H. S. Recorder, Lynn, Mass.*

A green little boy in a green little way,
A green little apple devoured one day,
And the green little grass now tenderly wave
O'er the green little apple boy's little green grave.

—*H. S. Review, Lowell, Mass.*

Autumn is here and winter on its way. What have we done in our school work, and what are we going to do? Do not let us be satisfied with the work done, but let us push forward to the goal which we have placed before us.—*The Vidette, H. S., York, Pa.*

R. F. Patterson, Consul-General at Calcutta, writes: "So much raw jute grown in India goes to the United States to be manufactured, and such a large proportion (about 60 per cent.) of the jute manufactures is shipped to the United States in the form of gunny bags and cloth, that it will be of interest to our manufacturers to know the probable output of the present crop. The average sown in the twenty-six districts in Bengal, where nearly all of the jute of India is grown, was about the average of the last five years, but something more than that of last year, when the crop amounted to 5,000,000 bales of 400 pounds each.

The average crop of the last five years was 5,581,000 bales, but the season has been more favorable this year, and it is estimated the present crop will amount to fully 6,000,000 bales.

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Wool Washing Machines, Wool Dryers, Wool Waste, and Rag Dusters, Duplex Bur Pickers, Waste Cards, etc. Write for information concerning our new automatic Cotton Dryer.

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MARKS BROS.**MERCHANT TAILORS,****42 Central Street, Lowell, Mass.**

The wind bloweth,
The subscriber oweth,
And the Lord knoweth
That we are in need of our dues.
— *H. S. Bulletin, Lawrence, Mass.*

Only a few are wearing the school pin. Why not get one and be loyal to your school.—*H. S. World, Topeka, Kansas.*

"A poet loved a star,"
What donkeys poets are!
If he had been more human
He would have loved a woman.
— *Philips H. S. Review, Watertown, Mass.*

On Wednesday, the 21st, the members of the second and third year woolen and worsted classes, under the direction of Prof. Barker, visited the Davis & Furber Machine Shop, and the Smith & Dove Linen Mill, at Andover.

The morning was spent at Davis & Furber's, at No. Andover. Here, the party was conducted around by Mr. Gibson, who explained all the processes of building the various machines, and show some new im-

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provements, particularly on the mule and condenser. This visit ended shortly before noon, and the classes returned to Lawrence, where refreshments were served.

In the afternoon, the classes went to Andover where Mr. Bell of the Linen Mill conducted them to the mill where the party was divided in three sections under the direction respectively of Mr. Bell, Mr. Smith and Mr. Lamont. These gentlemen guided them through the mill, explaining the various processes of manufacturing linen thread from the bale to the finished product. Besides seeing the various processes they were given a talk on the fibre before it reaches the stage of manufacture.

The party voted these among the most profitable visits made and feels deeply indebted to the gentlemen mentioned, for the courteous treatment received at their hands.

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BUFFALO'S ART PALACE.

MR. J. J. ALBRIGHT GIVES \$350,000 TO ERECT A PERMANENT ART BUILDING WHICH PAN-AMERICAN VISITORS MAY ENJOY.

The city of Buffalo is soon to have one of the most beautiful buildings in the western world, a public art gallery to cost upwards of \$350,000. The building is the gift of J. J. Albright, a citizen of Buffalo and a liberal patron of art, who desires to bestow upon his city a structure that will forever yield immeasurable pleasure to those who visit it, and, become, as well, a center of culture and art. The only

conditions imposed by the public-spirited donor that the city of Buffalo should furnish a site, and that the Fine Arts Academy of Buffalo, which is made the custodian of the property, should raise a maintenance fund of \$100,000. The city promptly deeded the site requested, which is just within the limits of Delaware Park, overlooking the beautiful park lake. The fine Arts Academy has com-

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plied with the terms of the gift as they applied to the maintenance fund, and the building will be hurried to completion as rapidly as conditions will permit. The building will be used as the art palace of the Pan-American exposition and thereafter become the permanent home of Buffalo's art collections.

This magnificent edifice will be 250 feet long by 150 feet wide, the principal facade looking toward the east. The building will stand upon a broad terrace 35 feet above the level of the park lake, which lies but a few rods below and to the eastward. The principal approach will be by a beautiful monumental flight of steps, the contour of the ground giving opportunity for stately embellishment. The terrace walls are to be of heavy granite blocks.

Statuary, fountains, formal floral



displays and lawns will complete the ornamentation of the terrace.

The style of the architecture chosen is the classic Greek, both the eastern and western facades showing rows of rich, graceful columns. The style is Ionic. A semi-circular colonnade forms the central figure of the west or Elmwood avenue front. The building has broad wings at the extreme northern and southern ends, terminated

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by porches which will be reproductions of famous architectural works of Ancient Greece. The highest peak is only 45 feet above ground. The Erechtheum of Athens has been a prolific source of inspiration for the architects, Messrs. Green & Wicks, of Buffalo. The portico of the Erechtheum, famous for its caryatides, will be one of the works to be thus reproduced. The Erechtheum was an ancient temple and is one of the most interesting of the ruins of the Acropolis at Athens. It was rebuilt after the Persian invasion, about 400 B. C.

Entering the building by way of the main approach one comes first to the hall of statuary, in the middle of the building, which is 71 x 100 feet. Directly west of this is the Hemicycle, a large semi circular room with tiers of seats and a rostrum, where lectures may be given before audiences of several hundred

people. North of Statuary Hall will be a gallery 35 x 58 feet. On either side of the corridor leading to this gallery are Library and Board rooms. Beyond, in the extreme north wing, will be seven studio rooms, connected by a long corridor. In the western part of the building are two ante rooms and four large galleries. In the large light basement will be numerous other rooms for all sorts of uses in connection with the proper management of the building, such as bicycle and cloak rooms, lavatories, janitor's quarters, electric lighting and heating, packing and storage. The building will be strictly fire-proof, the materials being white marble, steel beams, brick, cement and stone. The structure will require 25 000 cubic feet of marble. All materials will be of the best, so that an enduring edifice may remain when present generations shall have vanished.

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PAN-AMERICAN EXPOSITION EMBLEM.

The official emblem of the Pan-American exposition, which was designed by Raphael Beck, a Lockport artist, and was accepted as the most artistic and suitable of several hundred designs submitted, has the especial merit of effectively symbolizing one of the chief purposes of the exposition, which is to bring into closer social and trade relationship the republics, states and territories of North and South America. The emblem shows a fair maiden typifying the North, extending a kindly hand to clasp that of her brunette sister of the South, thus forming a bond of



continental sisterhood and establishing a unity of sentiment and interests between the countries of the Western Hemisphere.

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Lowell Textile Journal

HISTORIC STUDIES IN HOME FURNISHING.

TAPESTRIES AND OTHER TEXTILES.

By MARGARET AINSLEE.

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(CONTINUED.)

After the monopolization by the court of the productions of the Gobelins, the looms at Aubusson were obliged to meet the more general requirements of the people; they were, therefore, protected against foreign rivals, and have produced work, good of its kind, but not as ambitious as the panels of the royal tapestry weavers.

Although England has been content to import rather than to manufacture tapestry, the revocation of the edict of Nantes and the sacking of Antwerp brought to her shores many foreign weavers whose influence upon English textile fabrics is plainly to be seen in the specimens in various royal palaces and museums. Within recent years William Morris has made from designs by Sir Edward Burne-Jones tapestries which many consider quite equal in artistic excellence to the best Flemish weavings. Some

critics, however, claim that this modern patterning is too decided, the anecdote too importunate, the result too overpowering to the general furnishing, and is, therefore, lacking in the restfulness of the faded storied tapestry. Certainly Morris did not aim at the exaltation of the misty in his worsted frescoes, for he distinctly states that "the first thing to be considered in the designing of tapestry is the force, purity and elegance of the silhouette of the objects represented, and nothing vague or indeterminate is admissible. . . . Depth of tone, richness of color and exquisite gradation of tints are easily to be obtained in tapestry, and it also demands that crispness and abundance of beautiful detail which was the especial characteristic of fully developed mediæval art."

Upon general principles, realistic

flowers and modeled figures are unsatisfactory and frequently discomfiting, because figured tapestry hangings, like other designs, must lose their freshness and harmony by exposure, and when, as oftentimes happens, the change in flesh tints and draperies is not uniform, they present a poor appearance; the flutter of a draught may unsettle the perspective and an inadvertent fold may sever a courtier's head from his trunk. The so-called "verdure" pieces, however, were but improved by the mellowing blend of time. In an old French work we even find this work recommended as a cheering thing for melancholia: "If I were in your place I would buy a fine hanging of tapestry 'de verdure,' and I would suspend it in your daughter's room to enliven her mind and raise her spirits."

When Louis XIV, gave tapestries worth a small fortune to the Kings of Spain and Prussia and to the Czar of Russia, there was no lack of occupation for the royal tapestry looms. Since such commissions are no longer given, and since the wall hangings of feudal castles and cathedrals—the "softer echo of stained glass," which taught its simple lessons of chivalry or morality—have been long since replaced, first by carved wooden paneling, then by stamped leather,

and recently by color-printed papers, tapestry weaving is gradually becoming one of the lost arts, and unless the old tapestry factories can devise a means of bringing about the excellence of mediæval work in competition with modern machine-made products the doom of this romantic fabric is inevitable.

The manufacture of carpets much resembles that of tapestry except that (in a high-warp velvet pile) the worsted threads of the web which form the surface of the carpet are joined by a double knot on two threads of the warp, thus forming on the face a ring proportionate to the height of the pile. Next comes the shearing of the carpet, whose beauty is largely dependent upon the precision and nicety with which this last operation is performed. Carpets were originally used as table and couch coverings and draperies, but have been lowered in use as the cheapened cost of production has lowered their price. Nowadays the fine old oriental carpets are but relics of the fabulous splendor of eastern rajahs, who not only adorned their tents with priceless hangings, but had them spread along the roads over which they rode in triumph. Primitive carpets varied in use and construction, ranging from the little square of plaited reeds upon which the oriental jeweler fashions his exquisite gold

work, the woven mat upon which the fakir communes immovably with nature or the rug upon which the Mussulman utters his prayers toward Mecca, to the magnificent pile carpets of Persia, whose bold, conventional patterns, magnificence of color, largeness of mass and vitality of detail, make them easily the finest in the world.

The carpets of Smyrna are said to be woven entirely by women's hands. A traveler in the east states that as soon as a little girl can hold a shuttle she is allowed to have gay-colored worsteds with which to weave upon a primitive loom, set up by stretching the cords of the warp between two trees. There, with nature for her teacher, she starts to make the carpet which is to be her dowry. Woven with an inherent love of color and feeling for the proper continuity of shades, her handiwork grows to completion as she grows to womanhood. Then appear two purchasers, by whom the excellence of her life-work is tested; one carries away her carpet, the other takes her as his wife.

Oriental carpets may be divided into three classes—the Turkish (chiefly from Smyrna), the Persian and the Indian—all producing, from the simplest elements, rich and harmonious coloring and marvelous wearing qualities. The mys-

terious "hour," or "tree of life," generally forms the chief motive or center of the Persian and Indian carpets, and also of the southern European textiles subject to Persian influence. England has given great attention to the manufacture of low-warp carpets, many of the products of her loom comparing favorably with those of the orient. In fact, the manufacture of the printed and woven carpets of Brussels (made at Kidderminster) Wilton and Axminster now contribute largely to the material prosperity of England.

As a worsted carpet is woven much as a piece of silk, it will easily be seen that Jacquard's perfection of machinery by which the pattern works itself out under the hand of the worker, after traversing the cylindrical holes of many thousand pattern sheets of pasteboard, has practically revolutionized these allied arts. Into the clutches of this democratic machine, invented a hundred years ago, high-art tapestry and all the weavings of the future are bound to come. The velvet carpet of Savonnerie, made in imitation of the oriental Turkey stitch, was known as tapestry carpet in the sixteenth century.

With floor coverings, as with tapestry, the tone should be low, the well-covered design discernable only upon study, suggestive but

CONSTRUCTION AND ORIGINATING OF WEAVES.

BY CHARLES G. PETZOLD.

A Text Book for designers, overseers, loom-fixers, web drawers, weavers and others who are interested in the construction of cloth. On receipt of 25 cents, a copy of Parts I and II will be mailed to any address in the United States and Canada. The work is richly illustrated, and the rules for construction of weaves clearly explained. It will consist of two hundred and eighty pages, and about 24 plates of art weaving, and is to be published monthly in twelve parts.

CHARLES G. PETZOLD.

37 Whitman Street, - - - - - Lawrence, Mass.

not imitative of natural beauty, conspicuous by its absence of endeavor after perspective or atmospheric effect.

An always beautiful textile which, to an unusual degree, retains the old-world atmosphere so sadly lacking in our modern manufactures, is the shawl made in the Vale of Cashmere. These artistic woolen shawls are made of the wool of the Cashmere goat and of camel's-hair wool. They are woven by the natives on looms so small and primitive that the shawl has to be made in separate sections. The center piece, generally the cone pattern, decorated with a sprinkling of small flowers, is first set out; and the

other pieces, a diapering of minute floral forms, are ranged in a pattern around it, and may be extended according to the fancy of the worker. The fine, skillful joining is gone over in embroidery of subdued and dark shades, producing a design. A few of the costliest shawls are embroidered with a paradise of singing birds, animals and flowers. Like almost all oriental fabrics, they are distinguished by an unevenness in design, which, in spite of occasional confusion, generally produces a unique appearance of light and shadow, and at a distance has the effect of low relief. Clever machine-made imitations are made in Paisley, Scotland.

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DESIGNING DEPARTMENT.

We intend to make the designing department one of the main features of this Journal, and the information will be of a practical character relating to the designing and manufacturing of textile fabrics, be they cotton, worsted, woolen or linen. It would not be difficult for us in each issue, to place before our readers a large number of designs, which would appear on the paper very beautiful and imposing, but possessing only very little practical value. Such is not our intentions, we propose to give to each design all the information to produce a fabric that is marketable and of a commercial value. These designs will not be merely for the manufacture of a certain kind or class, but for any or all classes of fabrics for which the designs are suitable.

For example, let us suppose that a design for a worsted coating is given, and the specification of the complete construction is given, number of threads per inch of warp and filling and the counts of the yarn from which the cloth is to be made are such as will produce a fabric of a given weight; that weight may be such as will serve the purpose of one manufacturer, or meet the requirements of a certain market;

but it may not meet any of the requirements of another manufacturer, and it may be quite unsuitable for another market. Then, in all probability, it becomes quite useless, except to a very small section of those who may be interested in the production of such fabrics, though the design itself may be a very suitable one if it could only be applied to the weight and class of fabric which it is desired to produce. As a matter of fact, the mere laying out of a design upon squared paper is, or should be, the simplest duty of a designer.

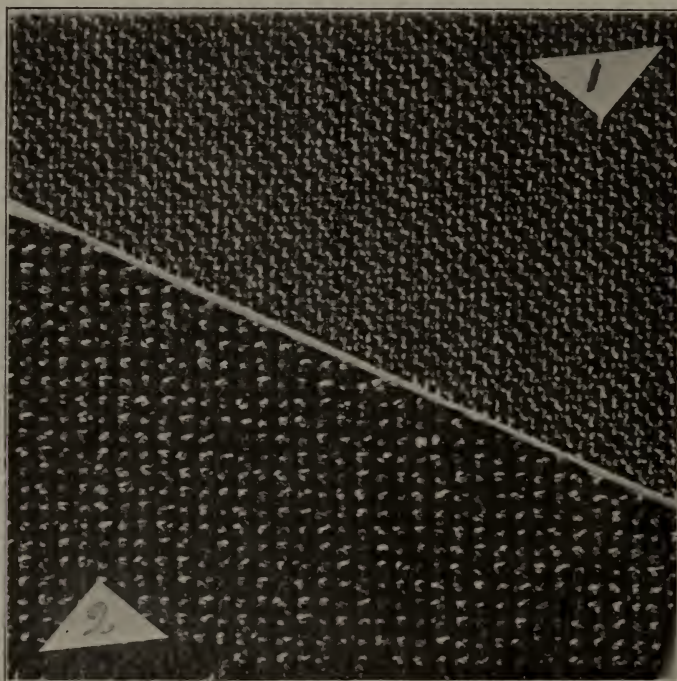
More skill and ingenuity by far is required in determining the size and quality of the yarns and the number of threads in a given space of warp and filling respectively, which will be suitable for the design and which will produce a perfect cloth, than in the mere laying of the design upon paper. Not merely will worsted goods be dealt with, but fancy woolen goods, dress goods, both in woolen, cotton, linen and silk shirtings, gingham and all goods in cotton and linen.

An endeavor will be made to keep abreast of the times in regard to the classes of fabric, design and pattern in demand; so that what is

inserted in these columns may be of immediate practical use to our readers.

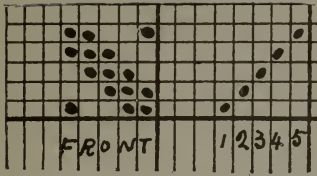
It will be the object then, in these columns, to assist all observations as to the fashions and colors in vogue. No effort, labor or expense will be spared to keep readers of this Journal posted up in what is being done in the trade, in the turns

wrong. The fact will be taken as it exists and patterns prepared which it is believed, will meet the requirements of the public taste. To do this more efficiently, hints and suggestions from readers will be welcomed; if any one thinks that there is undue prominence given to any branch of the trade, those communications will be re-



which fashion may take, whether they be whimsical or otherwise, and to place before them designs and instructions for the production of fabrics of every description which will be likely to meet the public taste. No attempt will be made to uselessly criticise the changes in fashion and to say whether they are in the right direction or in the

ceived in the most cordial spirit and will receive full consideration. The sole desire is to treat the subject in the most full and complete manner, and therefore the co-operation and criticism of all interested is freely invited, as they will be of the greatest possible assistance in the efforts to do justice to a most important subject.



Pattern No. 1, Chain and Draft.

PATTERN NO. 1.—SUITING.

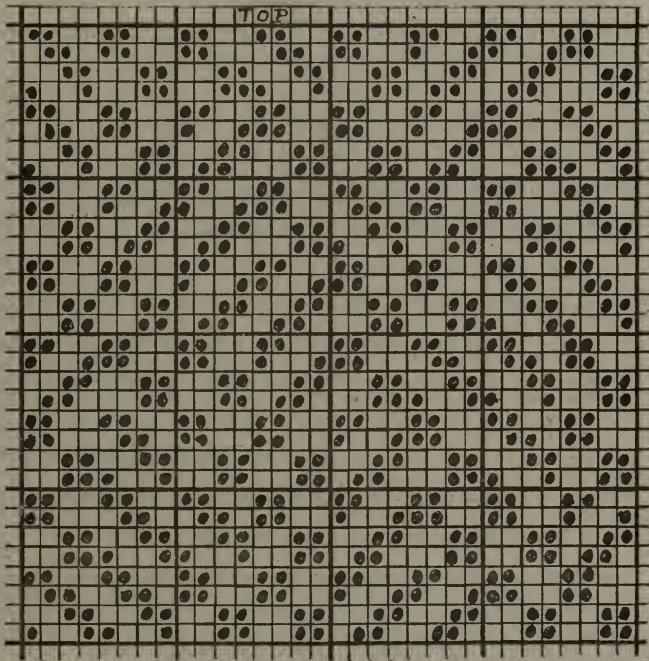
- A Dark shade, 3 1-2 run.
 B Light tone and bright color, D and T,
 7 1-4 run in the single yarn.
 C Middle tone, 3 1-2 run.
 D Light tone, 3 1-2 run.

WARP.

- A 2 threads.
 B 1 thread.
 3 threads in a pattern.

FILLING.

- C 2 picks.
 D 1 pick.
 3 picks in 1 repeat of the filling.



Pattern No. 2, Full Design.

Specification.—3060 threads in the warp.

15 reed x 3 threads in 1 dent, or 45 threads per inch.
 68 inches wide within the selvages.

52 picks per inch in the loom.

15 per cent shrinkage at the fulling.

56 inches wide finished, within selvages.

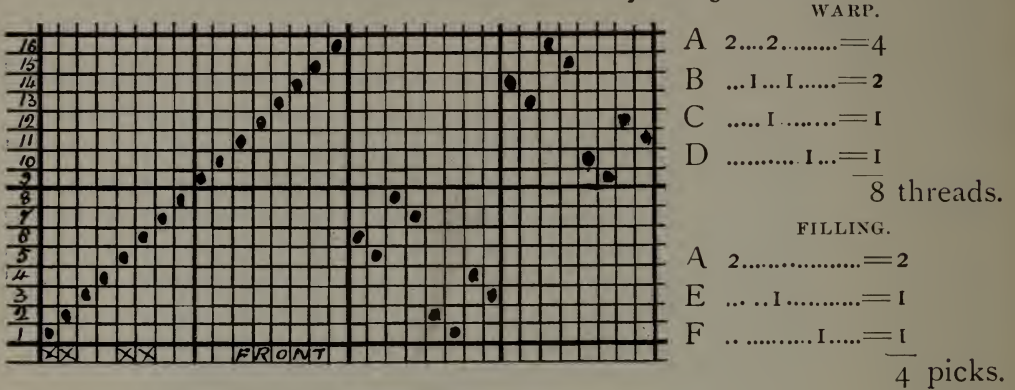
Velour or short velvet finish.

The design is on 5 harnesses.

Begin the warping and weaving in accordance with the warping and filling plan, also with the first thread and pick of the design.

PATTERN NO. 2.—SUITING.

- A Dark shade, D and T, 3 1-2 run when twisted.
 B Dark and bright colors, D and T No. 1, 3 1-2 run.
 C Dark and bright colors, D and T No. 2, 3 1-2 run.
 D Dark and bright colors, D and T No. 3, 3 1-2 run.
 E Dark and light colors, D and T, 3 1-2 run.
 F Dark and white knickerbocker yarn, 3 1-2 run.



Pattern No. 2, Drawing-in Draft.

Specification.—2160 threads in the warp.

8 1-4 reed x 4 threads in 1 dent, or 33 threads per inch.

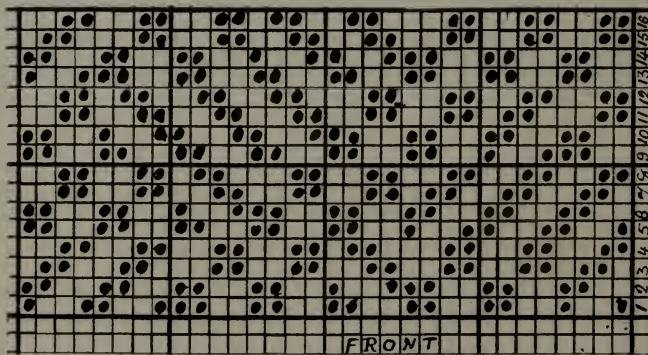
65 $\frac{45}{100}$, say 65 1-2 inches wide within selvages.

34 picks per inch in the loom.

15 per cent. shrinkage at the fulling.

56 inches wide finished, within selvages.

The design is reduced to 16 harnesses.



Pattern No. 2, Reduced Chain.

Make the threads and picks A correspond to the first and second threads and picks on the design.

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GLEANINGS FROM CONSULAR REPORTS.

COTTON CROP OF CENTRAL ASIA.

Vice-Consul Smith, of Moscow writes that the cotton crop of central Asia, according to calculations based upon the area sown, is expected to be excellent this year. In many instances, as for example in the Fergansky districts, the area of the sown cotton fields has increased over 30 per cent., and in some of the other districts even more. Last year's demand for cotton amounted approximately to 15,000,000 poods (240,395 tons), of which about 6,000,000 poods (96,774 tons) came from central Asia. This year's

crop is expected to be between 7,000,000 and 8,000,000 poods, or enough to meet half of the general demand. The remaining cotton required for manufacturing purposes in Russia will have to be imported.

THREAD AND CLOTH MILL CONCESSION IN NICARAGUA.

Consul Sorsby, writing from San Juan del Norte, informs the department that on the 22nd of September last the Government of Nicaragua granted Pedro Mas, a native of Spain, a concession to establish

A NEW HAWK-EYE
For the HOLIDAYS.

No. 3 Folding Weno Hawk-Eye.

A. H. SANBORN & CO.,

PHOTOGRAPHERS and
PHOTO. SUPPLIES.

53 Central Street, Lowell, Mass.

CHAS. H. FROST.

J. EDWIN LYLE.

WATCH HOSPITAL.

The correct time is what you want. Let us repair your watch, and we will give you a written guarantee, if you go by your watch you will always be on time. Four surgeons always in attendance.

C. H. FROST & CO.

Repairing of all kinds of Jewelry our Specialty.

120 Central St., Lowell, Mass.

OTIS ALLEN & SON, LOWELL, MASS.

Allen's Standard Lock-Cornered Filling Boxes,
GENERALLY USED IN THE NEW ENGLAND MILLS.

Roving Cabs, Doffing Boxes, Packing Cases, and Cloth Boards.

WRITE FOR PRICES.



TELEPHONE.

a factory for the manufacture of cotton threads and cloths, such as prints, percales, indianas, etc. This concession, continues Mr. Sorsby, is made an exclusive privilege for a period of five years. It may be transferred (but not to another government), and shall at all times be subject to the laws of Nicaragua. Questions arising shall be settled by arbitration and in no case shall be foundation for a diplomatic claim. The right to form and legalize foreign corporate associations is permitted, such associations to have a representative with full power domiciled in Nicaragua.

DRY GOODS IN GUATEMALA.

Consul-General McNally, of Guatemala, writes under date of November 2, 1900, as follows:

I am informed by many local dealers in dry goods that United States drills, prints, and shirtings

are in demand and are being constantly called for. Raw and bleached cotton yarns, packed with care, would also find a ready market. I believe that ready-made clothing for men would prove a good item of export. The people seem anxious to buy American goods when they can be found. Although there are many Americans in business here, their goods are imported from Europe and are of the cheapest and most shoddy quality. There is an excellent opportunity for American business men who will cater to the wants of the people.

OPENING FOR FLAX IN GERMANY.

William K. Herzog, German Consul, writes:

Since the date of my last report prices of flax yarn in Europe have advanced 10 or 12 per cent. because of the scarcity of raw flax. A number of mills are closed;

CAMERAS

AND

SUPPLIES.

TYPEWRITERS

AND

SUPPLIES.

BICYCLES

AND

REPAIRING.

RUTLAND & SMITH,

195 Middlesex Street,

Telephone 653-5.

Lowell, Mass.



others work half time or operate only some of their spindles. All the mills could operate at full time if they had raw material in sufficient quantities and at reasonable prices.

Russian flax will come into the German and Austrian markets in January, 1901. Should it be possible to offer American flax in the near future, our growers might find a steady market for their product; but it is evident that it should be offered as soon as possible.

The German and Austrian flax spinners will meet at Breslau, Germany, December 11, 1900, and at Trautenau, Bohemia, December 13, 1900, together with the Belgian and Russian dealers in raw flax. This would be a splendid opportunity to offer American flax samples. A German business man engaged in the flax business informs me that he will gladly show

American samples of raw flax at these meetings.

WOOL SALES AT MELBOURNE.

Consul-General Bray writes from Melbourne, October 19, 1900:

The opening sale of the Melbourne wool season was held on October 17, 1900. The sale attracted crowded attendance and keenness of bidding characterized it from start to finish. A heavy fall has taken place between the opening and highest rates of last season and those of this sale. As far as can be judged from the comparatively few clips disposed of, prices are about 40 per cent. for merino fleece and about 45 per cent. for merino pieces and bellies below the opening rates of last season. In greasy wool, the highest price realized was 8½d (17½ cents), other prices being 8d (16 cents), and 7d (14 cents); and scoured

JOHN DENNIS.

J. NELSON DENNIS.

JOHN DENNIS & CO.,

Press Manufacturers, either Hydraulic, Screw, or Toggle Joint.

Hollow Plate Finishing Presses and Balers.
Belting, Curriers' and Roll Coverers' Machinery.

Saunders Street, Lowell, Mass.

MERRIMAC CHEMICAL CO.,

75 and 77 Broad St.,
Boston, Mass.

MANUFACTURERS OF

*Oil Vitriol,
Muriatic Acid,
Nitric Acid,
Acetic Acid,
Acetate of Soda,
Alum,*

*Sulphate of Alumina,
Chloride of Alumina,
Hydrate of Alumina,
Acetate of Alumina,
Glauber's Salt,
Sulphate of Soda,*

*Bi-Sulphite of Soda,
Hypo-Sulphite of Soda,
Tin Crystals, Etc.
Aqua Ammonia,
Wood Alcohol,
Colors.*

Incorporated 1863.

Proprietors of Wm. H. Swift & Co.'s Works.

PLEASE WRITE FOR CATALOGUE.

brought 16d (32 cents) and 15½d (31 cents). No American buyers were present at the sale, though it is estimated they will purchase about 20,000 bales during the season.

WOOL EXHIBITORS AT EXPOSITION.

At the exposition of 1900 there were inscribed in the catalogue 132 wool exhibitors of French origin, 32 from Algeria, 4 from Indo China, 1 from the Sudan, 33 from Tunis, 9 from Germany, 26 from Austria, 7 from Belgium, 12 from Bulgaria, 1 from Korea, 10 from Ecuador, 52 from Spain, 17 from the United States, 32 from Great Britain, 9 from Greece, 13 from Hungary, 1 from Croatia, 13

from Italy, 3 from Japan, 25 from Mexico, 1 from Nicaragua, 4 from Peru, 44 from Portugal, 21 from Roumania, 50 from Russia, 5 from Servia, and 1 from Switzerland.

BRITISH IMPROVEMENTS IN KNITTING MACHINES.

S. C. McFarland, Consul, Nottingham, October 30, 1900, writes:

Among numerous improvements in knitting machines which have reached the practical stage, but have hardly attracted the attention even on this side which their merit seems to warrant and are practically unknown upon the other side, are the "Maximum" knitting machine and the Bettney improved splicing mechanism.

Continued on page 29.

THE WILSON Cloth Trimming and Inspecting Machine

GIVES BEST RESULTS AT LOW COST OF OPERATION.

The large number in use in leading mills "Tells the Story" of their success.

Quick Delivery. Write for Quotations.

PERHAM & STICKNEY,

(Successors to Atherton Machine Co.) *LOWELL, MASS.*

F. A. & P. HALL, Cotton and Worsted Machine Builders.

Owing to the death of Mr. Wm. A. Smith, of the firm of Stedman & Smith, and the retirement of Mr. W. L. Stedman, the entire business of the above named concern, including the tools, stock and good will, has been purchased by F. A. and P. Hall of the Bee Hive Spindle and Flyer Works, established by Thomas Hall in 1870. The Messrs. Hall are now the sole builders in the United States of the well known Horrocks Patent Drum Winders (as built by Stedman & Smith) for cotton and worsted.

Drop wires, skewers, change gears, etc., also parts for spinning

frames and gill boxes, furnished at short notice. Our capacity for making Spindles, Flyers, Whirls and Steel Caps (bell mouth or conical) is about doubled, and we respectfully request the continued patronage and confidence of the customers of the retired firm, also thank our patrons for the interest shown us in the past, which we intend to merit from the additional parties with whom we hope to do business in the near future.

Respectfully yours,

F. A. & P. HALL.

Lawrence, Mass.

The young ladies of Centralville must be very attractive. Congratulations are evidently in order for one of the fellows at the school, as a certain young lady in Centralville is wearing a diamond ring given her by one of the "Textiles" a short time ago—"so the story goes."

G-nt claims that a "young lady" presses his trousers for him every Sunday. Which way, Joe?

Cr-g has a new occupation, converting the "heathen Chinees." He has tried it at the Chinese restaurant, but has been unsuccessful up to date. Try again.

D. H. WILSON & CO., Coppersmiths, Plumbers, Steam and Gas Fitters, Sanitary Engineers.

Manufacturers of Slasher Cylinders, Silk and Dresser Cylinders, Color and Dye Kettles. All kinds of copper work for mills. All work warranted satisfactory.

Shop, 279 and 283 Dutton Street,

LOWELL, MASS.

INCORPORATED JUNE 4, 1890.

AMERICAN CARD CLOTHING CO.

GENERAL OFFICES: WORCESTER, MASS.

FACTORIES: Worcester, Leicester, North Andover, Lowell, Mass., Philadelphia, Pa.,
 Providence, R. I., Manchester, N. H., Charlotte, N. C.



Manufacturers of Every Description of Card Clothing
FOR WOOL AND COTTON CARDS.

Smooth, Side, Plough-Ground and Needle-Point. Exclusive American Licensees
 for the Patent Flexifort Card Cloths.

Special attention given to Clothing for Revolving Top Cards. Experts furnished to clothe
 and start the same. Latest and Best Machinery for re-covering Iron Top Flats for Revolving
 Flat Cards and Stationary Flat Cards with our Special Improved Steel Clips.

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.

Sub Editor, Secretary and Treasurer.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, = Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second
Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid \$1.00

Single Copies 10c

For Sale at all Newsdealers.

Advertisements must be at the Journal Office before the
fifteenth of each month for insertion that month.

Contributions may be sent to Editor of The Lowell Textile
Journal, and will receive prompt attention.

EDITORIAL.

A happy and prosperous New
Year to all.

...

First day of January, 1901, the
first day of the 20th century.

...

Let us discuss for a moment the
position of a manufacturer, say at
the commencement of a season,

he is about to set to work to pre-
pare his patterns. Now, what has
he to guide him as to style of pat-
terns he must adopt? So far as
weight goes he may have no diffi-
culty. The winter and summer
season respectively, require that he
shall produce heavy or light cloths;
but he has to determine the char-
acter of the pattern he will employ
and the application—the suitability
or unsuitability of the particular
pattern or class of pattern he is
about to employ to the fabrics,
heavy or light. Some patterns are
of such a character that they may
be suited for light cloths only;
others may be suited for heavy
cloths only; and again, others may
be equally suited for both. Before
further discussing the suitability of
patterns to particular fabrics, the
manufacturer must first examine
how he determines what class of
patterns he must employ.

...

There is no better indication of
the direction in which public taste
and fashion is about to run than is

HEADQUARTERS FOR

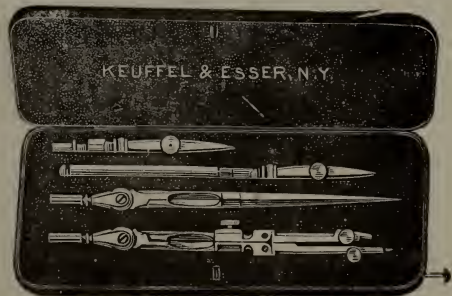
ELEGANT GERMAN AND SWISS

DRAUGHTING • INSTRUMENTS.

W. T. S. BARTLETT,

The Up-Town Hardware Store,

653-659 Merrimack St., Lowell, Mass.
Telephone.



BEST HALF-HOSE HAVE THE

Shaw Knit

ON THE TOE

TRADE MARK.

SHAW STOCKING CO.

LOWELL, MASS.

SEND FOR FREE CATALOGUE

obtained by a careful observation of what has been the fashion and the changes which have taken place, not in one season merely, but in several seasons back.

A little observation will convince anyone that the human mind is constantly requiring change and relief, and in no matters more than in dress.

Not only is the "style" or "cut" of the garment required to be varied to gratify this desire for change, but the style of pattern of the fabric and also the character of the fabric itself.

Some manufacturers have a happy faculty of being able readily to adapt themselves to the requirements of the times and to produce at the proper moment exactly the character of article which is required. They meet the public taste without any apparent effort on their part. They produce both the class of pattern and the character of fabric which immediately becomes popular. As a consequence their goods command a ready sale, they lead the market, they are credited at once with being the possessors of good taste; they are men of judgment, and they reap the full

COLUMBIAN STUDIO,

OUR SPECIALTIES:

BROMIDE, CRAYON AND PASTEL WORK.

We are Unexcelled in Children's Photos.

Sittings made in Cloudy
as well as in fair weather.

J. POWELL, Photographer,

55 So. Whipple St., Lowell, Mass., Tel. Connection.



EVAN ARTHUR LEIGH.**Platt Bros. & Co. Cotton, Woolen and Worsted Machinery,**

Sykes' Card Clothing for Cotton. Critchley's Card Clothing for Woolen and Worsted. Donsfield's Grinding Machinery, and Emery filleting kept in stock, and other mill supplies.

35 and 36 MASON BUILDING,

BOSTON, MASS.

benefit of their labors as they thoroughly deserve to do.

The question now arises, is it "good taste" merely which makes these men successful? Is it not something more than good taste? Is it not more the exercise of sound judgment based upon accurate observation.

Everyone knows that any man's taste is liable to run in one groove, and that probably a very narrow one unless it be corrected, and it can only be corrected by contact with the product of others. If his observations are confined to the narrow field of his own productions his ideas of novelty become narrowed down. His own peculiar notions of the proper fitness of things develops into a prejudice, a sort of idiosyncrasy.

Everyone displays bad taste but himself, unless they follow exactly his peculiar line, and consequently

he rapidly becomes quite unfitted to minister to the wants of others. Then it is very evident that if a man is to be a successful manufacturer he must observe accurately what is going on around him. He must study well the goods of the present and of the past seasons, and must be thoroughly conversant with all that has been done, of all the changes which have taken place, of the inclination of the public mind to one style of fabric or another. He will trace in his own mind as it were on a map the course which has been followed for a number of seasons. He will form his own conclusion as to what is the probable course of the future and this he will follow, still keeping his eye upon the public, so that if they make any deviation from the course which he has expected them to follow he is ready to be with them, not following, but ready

→TABLE CUTLERY←

CARVERS, FORKS, SPOONS, STEELS, ETC.

HOLIDAY GOODS OF ALL KINDS.

BARTLETT & DOW, 216 Central St., Lowell, Mass.

H. H. WILDER & CO.,
Furnaces, Stoves, Ranges, Kitchen Furnishing Goods

Nos. 29 and 31 MARKET STREET, LOWELL, MASS.

to step in front and almost lead them. He will cast aside his own predilections and his own personal taste, and produce that which he sees the public mind desires. In fact, his taste is now that of the public. He studies their wishes, he watches their every step, and whichever direction their taste or desires may be leading he is with them, ready to cater for them, and produce exactly that which they require.

It may therefore be said that it is sound judgment based upon accurate observation, assisted by "good taste," or an eye for the beautiful, which makes the manufacturer successful.

There are so many members of the evening class in the weaving department that Professor Nelson has to divide the class into two sections.

We are so crowded with matter for the Journal that we cannot spare space for the Exchange department, but we beg to wish our many exchanges a happy and prosperous year, and acknowledge the following much appreciated magazines:

Philips High School Review.
 Parsons High School Sentiment.
 Blee's Military Academy Monthly.
 Harry Hillman Academy, Res. Academical.
 Leominster High School, The Thistle.
 Linden Hall Echo.
 Great Barrington, The Blotter.
 Wakefield High School, The Beacon.
 York High School, The Vidette.
 Somerville High School, The Radiator.
 San Jose, The Normal Pennant.
 Neligh, The Gates Index.
 Binghamton, High School Panorama.
 Appleton, Ryan Clarion.
 San Francisco, Cogswell Petit Courier.
 Shelburne Falls, Arms Student.
 Lynn High School Gazette.
 Topeka High School World.
 English High School, Lynn Recorder.
 Albany Academy, The Cue.
 Lowell High School, The Review.
 Amsterdam, High School Record.

H. E. SARGENT & CO.,
Allfree High Speed Economic Engines,

Corliss Engines, Cook Water Tanks and Boilers.

EQUITABLE BUILDING, - - - - - BOSTON, MASS.

C. E. RILEY & CO.,

281-285 Congress St.,
BOSTON, MASS.

Latest Improvements and Specialties.

IMPORTERS AND BUILDERS OF

COTTON,
 WOOLEN, and
 WORSTED

MACHINERY

CARD CLOTHING,
 EGYPTIAN COTTON, Etc.

We have pleasure in awarding to Mr. William Nelson the first prize of ten dollars for his essay on "The Jacquard Loom, its Use and Construction." Mr. Nelson is head instructor on weaving and weaving machinery at the Lowell Textile School. The competition was free to all subscribers to the Lowell Textile Journal. We are very sorry there were so few competitors.

"BORU CLUB" NOTES.

A meeting for the election of officers and reorganization will be held shortly after vacation. Look out for notices in your lockers.

Thesecond degree will be worked at the same time on the several candidates that have "successfully" passed the first.

The new house does not seem to be forthcoming, but have a little patience, "time worketh wonders."

Worthy Chief has been heard from and is anxious for the work to go on.

The Club members have forgotten, in a way, the signal for admission and were troubled at the last meeting by a non-member who was desirous of entering the hall but knocked at the wrong time.

We want more members. Hustle up a little, boys, and swell the organization.

"EFRA."

"What makes you think this new hand is likely to rise rapidly over the other men in the factory?"

"I noticed last night that he worked nearly four seconds after the whistle blew."

STUDY

the points of our different machines and compare with others.

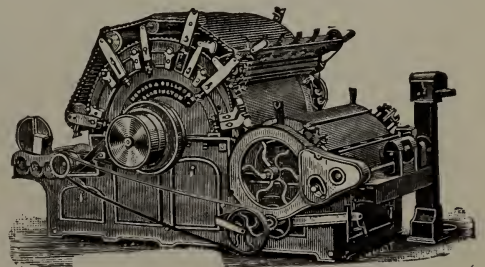
UNDERSTAND

the merits and you will be convinced beyond a doubt of their superiority.

HOWARD & BULLOUGH

American Machine Co., Ltd., Pawtucket, R. I.

Boston Office, 281 Congress Street.



STEAM BOILERS, AND ALL KINDS OF *STEEL AND IRON PLATE WORK.*
SCANNELL & WHOLEY,
 TANNER STREET, LOWELL, MASS.

WEAVING.

Conducted by WILLIAM NELSON, Head Master of Weaving Department, Lowell Textile School.

SWELLS OR BINDER.

The question as to what shape of swell or binder is best, is not given the consideration it ought to have. There are two distinct shapes; we will term them the bow or blunted swell, and the gradual tapered swell. The first one is a swell that bulges into the box, and actually closes up the space where the shuttle ought to have almost free access into the box. The consequence is the shuttle strikes hard when it enters the box, and there is not a single case to my knowledge, where such a swell is used, but that the face of the shuttle is almost worn away. A decent

shuttle is a rarity on looms where these swells are used.

Such a swell requires more power to drive the shuttle because the shuttle comes too suddenly in contact with the swell, and there is undue friction on the binder pin, also on the protection finger; we might positively assert there are more rebounding shuttles on looms that have the bowed swell than on the tapered swell in this way.

There being less space in the box where the shuttle strikes the binder, more power has to be added to the pick motion to drive the shuttle far enough in the box, this sudden

HAMBLET MACHINE CO.,

Successors to Duston Machine Co.

Engineers * and * Machinists.

PAPER CUTTERS.

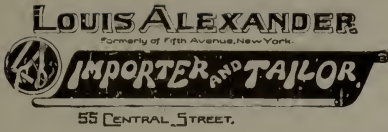
Special Machinery Built. Repairing attended to Promptly. Pulleys, Shafting, Gearing, Etc.

GEORGE W. HAMBLET, *Proprietor,*

Telephone Connection.

LAWRENCE, MASS.

30 Island Street.



PAUL O. KABLE, Assistant.

SUNLIGHT SHOE STORE.

Wear the **Orient Shoe,**

Best \$3.50 Shoe in the World.

100 Central St., Lowell, Mass.

jar not only checks the shuttle, but causes the binder to spring back, and as we might say, the binder is taken off the shuttle and the shuttle shoots quick to the end of the box and rebounds a little; this might appear as if there was actually less pressure on the shuttle, but it has required more power in the first place to jump back the binder.

The gradual tapered binder is by far the best, and if you want a good running and good looking shuttle, try this. The shuttle instead of being jarred when it enters the box gradually slides in, and by the time the shuttle has reached its distance it has been gradually checked, the binder acting in part as the check, which it is supposed to do.

The more gradual you put the check on the speed of the shuttle when it is once in the box the less possibility there is of breaking the filling on either cop or bobbin.

To be continued.

"I hear your son is achieving great success in his stage career."

"Yes," replied the architect.

"I should have thought he would have entered your profession."

"Well, it amounts to the same thing. We both make money by drawing houses."

14,500,000 acres of India are given up to cotton. About one-third of the crop is exported.

WM. E. BASS & CO.,

Manufacturers of

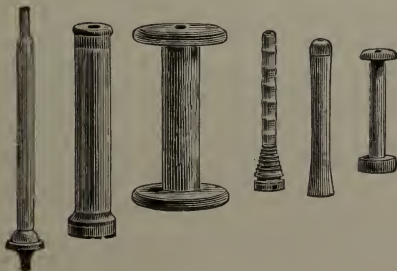
Bobbins, Spools, Shuttles

Of Every Description.

OFFICE,

493 Essex Street,

Lawrence, Mass.



JEREMIAH CLARK MACHINERY COMPANY,

(Successors to Jeremiah Clark)

NEW AND SECOND HAND MACHINERY.

Full Information will be Sent upon Application.

No. 277 Dutton Street.

Tel. Connection.

Lowell, Mass.

TWO PAN-AMERICAN EXPOSITION BUILDINGS.

ETHNOLOGICAL BUILDING.

The Ethnology building will be one of the most central in the extensive group now in process of construction for the great Pan-American exposition at Buffalo



next year. The site for this structure is at the east junction of the Court of the Fountains and the grand Esplanade. It will be conspicuous from all parts of the

grounds and its ornate character will entitle it to the place of honor to which it has been assigned.

The building is circular in plan with four main entrances connected by a continuous colonnade. The colonnade is seven feet above the level of the Esplanade, forming a loggia from which commanding views of the grounds may be obtained. The loggia will be adorned with a broad frieze above the windows and with other mural decorations, statuary and plants. Above the colonnade is a terrace with balustrade and statuary figures representing the ethnological types of the five different races.

Over each of the entrances is a pediment or low gable with the

C. G. SARGENT'S SONS, Gran'teville, Mass.

Builders of

Wool Washing Machines, Wool Dryers, Wool Waste, and Rag Dusters, Duplex Burr Pickers, Waste Cards, etc. Write for information concerning our new automatic Cotton Dryer.

FAULKNER MANUFACTURING COMPANY,

Woolen Manufacturers,

North Billerica, Mass.

68 Franklin St., Boston, Mass.

THE COLUMBIA NAPPER CLOTHING CO.

81 HOLLY STREET, LAWRENCE, MASS.

Our whole establishment is devoted to the manufacturing of **NAPPER CLOTHING**, exclusively for Cotton, Woollen and Knitting Mills. We can cover your machine with the best of Napping Wire at the **LOWEST PRICES**.
Correspondence Solicited.

Pan-American seal forming the decorative motive of the tympanum or triangular space of the gable. Back of and above each pediment is a sculptured group of horses. The roof of the building is a large dome like that of the Pantheon at Rome. This is capped by a decorative cresting which hides the skylight opening. Just below the dome in the encircling shaft are eight circular windows which light the upper gallery. There are two octagonal galleries, the first 25 feet above the main floor and the second 21 feet higher. On the main floor there are 20,000 square feet of floor space, or about half an acre. The galleries add 10,000 square feet more. The galleries and roof terrace are accessible by staircases and elevators on each side of the four entrances. The first gallery commands a fine view of the entire in-

terior and will be used for exhibition purposes. The second gallery opening on the roof will be used for restaurant purposes and for the accommodation of employes of the grounds. The roof terrace affords a broad view of the park, the Esplanade, Court of the Fountains, aquatic basins, sunken gardens, the mirror lakes and lagoons, buildings and other features of the exposition. The eight decorated piers of the interior support eight arches forming the octagon, which, with the pendatives, carry the dome. The galleries encircle the octagon, leaving an open space under the dome 80 feet in diameter and 120 feet high. In the center of the building is a fountain surrounded by seats and chairs. The building is intended to be a place of rendezvous for visitors. The structure is 140 feet high and was designed by George Cary of Buffalo.



Watch Repairing is my Business!

And I give careful, painstaking attention to it. I give special attention to the repairing of fine watches—the kind of Watches that need extra careful adjustment. I try to have my work give such satisfaction as will win the confidence of all who leave their Watch repairing in my hands. I want you to feel that when you leave your Watch with me for repairs the work will be done to the best of my ability and in a competent manner. It is my ambition to add to the reputation I think I have in a small measure already established, of doing honest, thorough Watch repairing.

SAMUEL KERSHAW,

Note the address,

114 CENTRAL STREET,

Lowell, Mass

"COST FINDING IN COTTON MILLS."

The only book published on "Cost Finding." Cloth binding price \$1.50.

FOR SALE BY

M. G. WIGHT & COMPANY, MILL SUPPLIES,
67 MIDDLE STREET. Tel. Connection. RULING and BINDING.
LOWELL, MASS.

THE PLAZA.

Standing at the great electric tower and looking to the north, the visitor will have before him the Plaza or square, a beautiful open space 350 by 500 feet. On the opposite, or north side of the Plaza, will be the Propylaea or monumental entrances, connected by a curved colonnade 280 feet long. These form an architectural screen of exceptional beauty, shutting out the steam and trolley railway station at the northern end of the exposition grounds.

A large building at the left, 341 feet long and 52 feet wide, with towers 164 feet high, will be used for restaurant purposes. This forms also the eastern entrance to the Midway or pleasure ground, where the visitor may find a collection of novel entertainments that will



astonish the most cosmopolitan traveler.

Directly across the Plaza from the restaurant building is a companion structure of the same dimensions, forming the entrance to the Stadium, or Athletic Field, where 25,000 people may be seated to enjoy the high-class contests in the athletic sports, in which champions from all parts of the world will participate.

A terrace slightly raised above the general level, will form the central portion of the Plaza. This terrace will surround a sunken garden, in the center of which will be a band stand, the terrace affording a large space for listeners.

If you desire to dress in correct style and good taste inexpensively, go to

NICKERSON, THE TAILOR,

Hildreth Building, Lowell, Mass.

SAMUEL H. THOMPSON, President.

ELISHA J. NEALE, Treasurer

The Thompson Hardware Co.,

IMPORTERS, MANUFACTURERS AND DEALERS IN

MILL SUPPLIES, TOOLS AND METALS.

All Kinds of Hardware and Builders' Supplies.

254 and 256 Merrimack Street,

-

Lowell, Mass.

SCHOOL CHIPS.

Lincoln '02, we regret to say, has been obliged to return home owing to a rather severe illness, and we hope to see him back at his studies after the Christmas holidays.

Craig '02 was suddenly called away to Springfield on account of his sister's illness. He will join us again the first of the year.

Cr-g had courage to have his picture taken the other day but his courage was not strong enough to see the result, so he left town. Come back "Cr-gie," we can stand it, if you can.

Woonsocket young ladies must have sharp finger nails and know how to use them. Arn-d says that it was a "bull briar" and that he

only caught a partridge. He must have "caught a tartar."

Do not call on a young lady (engaged), especially at the same time that the "groom that is to be" is present, as it may be uncomfortable. "Biggest Pat" will take a friendly warning.

We have all heard that pathetic little poem beginning: "How doth the busy little bee," but the "bee" was slow compared to the way some of the students are running out that—"204x288."

A new book about to be published and written by an authority on the subject. "Girls" is the title, and F.l-l-r is the author. Consult him when you want information on this difficult subject.

Lothrop & Cunningham
45 MERRIMACK ST.
LOWELL, MASS.

Come early for your holiday work. We have all the latest designs specially adapted to New Year trade and the well-known style and finish of our photographs should appeal to your judgment in the selection of your photographs. Our new Studio is at 45 Merrimack St., Hildreth Building.
Take Elevator. Tel. 841-3.

GOOD
BICYCLES

CHEAP.

Telephone . . .

Incandescent Gas Lamps, Mantles, Chimneys and Shades
BICYCLE REPAIRING AND SUNDRIES.

GEORGE H. BACHELDER,

110 Middlesex Street,

Lowell, Mass.

A PARABLE.

1 In the land of the Yankeeites there lieth the town of Lowell, an hour's journey from the sea coast.

2 And in that town there was a school called the Lowell Textile School.

3 And it came to pass that there was a paper in the school, "The Lowell Textile Journal."

4 And the students in that school took an exceeding great interest in that paper and did write good articles, and did "crack" each other in its columns.

5 And the Journal grew, and waxed exceeding strong and the editor was happy.

6 And it came to pass, there fell a blight on the students and they grew seditious and said to each other:

7 "What need of us to write for this paper. There are those who will labor for us. Let them labor while we rest."

8 "And why do we subscribe? Verily we do not need to do this great crime, for we can read our neighbors' paper. It is as good as ours.

9 And they did as they said.

10 And the Journal did suffer in consequence and did fall in dark days, and was not so strong as in the other days.

11 And the editor was worried.

12 And lo! Some of the advertisers did refuse to pay the shekels for their advertisements, and the editor grew exceeding unhappy.

13 An there spread an agitation among the students when these things came to pass.

14 And there were some in their midst that had written articles for the Journal.

15 And these latter arose and said to the students:

16 "Arise from thy sloth, and contribute to the Journal."

REPAIRING . . .

Repairing of Watches and Jewelry of all kinds in the best possible manner. Prices right and workmanship guaranteed.

CHAS. W. DURANT,

CENTRAL AND MIDDLE ST., LOWELL, MASS.

GRANT JEWELRY CO.,
Watches, Diamonds, Jewelry,

Silverware, Imported China, Clocks,
Optical Goods, Pocket Books,

FINE WATCH REPAIRING.

64 Merrimack Street, Lowell.

E. W. YOUNG,

Hildreth Building, Lowell, Mass.

THE CARE OF

HEAD, HANDS AND FEET.

Your patronage is solicited and satisfaction guaranteed.

FINE HAIR CUTTING and EASY SHAVING

Separate Parlors for Ladies.

HAIR SHAMPOO, 25c

WEDDING, PARTY AND PHOTO HAIR DRESSING.

Over twenty-five years experience in the business.

Boys' Hair Cutting, 15 cts

CURTIN'S, - - - 36 Central Street.

17 "You are exceeding willing to 'crack' each other in the school, why not do so in the Journal?"

18 "There is great need of thy help, and if you will labor, then the days of the Journal will be exceeding long."

19 And the students arose with one accord, and did even as the speaker had said, and they did write, and did subscribe.

20 And again the Journal grew, and waxed exceeding strong, and the editor was happy once more and he did say within himself:

21 "My burden hath been made exceedingly lighter and my heart hath been made glad within me.

22 And from that day forth the fame of the Journal was spread of the uttermost parts of the earth, and those that were in darkness and saw the light (of the Lowell Textile Journal) and were made exceeding happy.—Selah.

MORAL:—Students, "arise from thy sloth, and contribute to the Journal."

TWO HEADS ARE BETTER THAN ONE.

Consular Reports—Continued from page 14.

THE MAXIMUM.

The Maximum knitting machine originated in the idea of producing as many fashioned shirts and pants as can be made in cut work off the circular frame, in six divisions or more, for producing fashioned shirts and pants. The article produced is selvaged, same as a patent, and not a circular-fashioned article, and requires to be seamed on the "Kochler" or some other seaming machine, or can be seamed by hand, if required.

The article to be made is commenced on its narrowest width when desired to fashion, the fashioning "clawker" is thrown in while the machine is running, and

ATTENTION STUDENTS.

Special discounts to
Textile Students at

LAWLER'S BOOKSTORE,

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Incorporated 1884

TALBOT DYEWOOD AND CHEMICAL CO.,

Acids, Dyewoods, Chemicals, Drugs

And Dyestuffs Generally.

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Leather Loom Pickers,**

245 Market Street, Lowell, Mass.

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BURBANK HALL.

CLASSES:

Monday Evening	Beginners.
Tuesday Evening	Advanced.
Wednesday Evening	Intermediates.
Thursday Afternoon	Children.
Friday	High School.

Private lessons by appointment.

it commences to raise fresh needles into work on either side, by every 2, 4, 6, 8, 10, or 12 courses or more, according to the shape required.

On the fashioning clawker being lifted (while the frame is still running) the frame continues making straight work on the width arrived at. This straight work can be carried on as long as desired and the widening recommenced as required, till any width up to the full width of the division is reached.

Splicing can be applied anywhere and to any part simply by dropping a lever. The frame runs at 45 to 50 traverses a minute on its full width—say 32 inches—and, having two cam boxes to each division, makes 90 to 100 courses a minute. This, it will be seen, doubles the production of the old machine, provided the latter should go as fast.

The great feature of this frame is that the cams traverse only the actual width of the fabric being

knitted. Thus, if working on 16 inches, the traverse is only 16 inches, and on every widening that takes place the traverse is automatically increased; when not fashioning, the traverse does not increase. By this means, another 33 per cent. is claimed to be added to the production over and above the speed already quoted. In addition to this, there is an overhead variable drive, which, as the fabric is widened, automatically slows down till the full width of the division is attained. By this means the inch speed is maintained throughout.

On 16 inches, the speed is double that of the speed on 32 inches, the result being that as many superficial feet of fabric are produced on the 16-inch width as on the 32-inch width; or as many pounds of yarn can be worked up in a day on a narrow width as on the full width, thus giving a further increase of say 25 per cent. over the production previously mentioned.

*To be continued.***BOODY'S****DINING ROOM***Middlesex and Gorham Sts.,*

LOWELL, MASS.

Carriages for Weddings, Parties, Funerals,
and Depot Work.**Morse Coach Company,**

Stable, 380 Middlesex Street,

Telephone 32.

LOWELL, MASS.

Lowell Textile Journal

WEAVING.

Conducted by WILLIAM NELSON, Head Master of Weaving Department, Lowell Textile School.

SWELLS AND BINDER.—Continued.

While on the subject of binders, we desire to emphasize the following: The more sudden the shuttle is checked, as it enters the box, the more liability there is for the filling to be broken; because the shuttle not only strikes the binder and is jarred, but the back portion of the shuttle comes forward and strikes the front entrance of the box.

We will repeat a portion that was in the issue of January.

The more gradual you put the check on the speed of the shuttle, when it is once in the box, the less possibility there is of breaking the filling on either cop or bobbin. It is the sudden jar to the shuttle that breaks the filling; let us try and prove the point: Supposing the binder works loose and the shuttle instead of being checked strikes hard against the picker, causing the stick to strike hard against the end of the box, what is the result?

A rebounding shuttle, and further, in the majority of cases, broken filling; then it is the jar.

Whereas, if the shuttle gradually presses back the picker stick it is almost impossible to break the filling, unless the cop or bobbin was spoiled to commence with.

We would not advocate under any circumstances whatever, the fixing of a binder so that it would check the shuttle as soon as it enters the box, or in other words, we would not bend the binder as near to the front end of the box as possible, because it is faulty fixing.

There is not a loom but what bangs off, at one time or other, and if it is one where the binder is fixed as in the above paragraph, and you are weaving cloth anywhere near the full reed space, part of the shuttle will probably be in the shed whilst the other part is far enough in the box to press back the binder sufficient so as to clear

the dagger from the receiver, the result, a smash; and sometimes a shuttle is chipped through striking the temple, or the filling fork is bent and other faults. So what is the use of fixing with that possibility in view? Why not adopt the following system:

Taper the binder, that is have no hard shoulder on it, and when your shuttle is in the box, have the binder grip the shuttle, either half or just behind the half of the shuttle towards the back end; the latter is better, because you keep on the right side of the shuttle.

With the above system, we do not hesitate in saying that you will be running your shuttle in as near perfect a manner as possible, that is as far as the binder has to do with the running of the shuttle and it is almost the whole of it.

Why is the above the best? First, there is no fear of a smash from the shuttle if it should be past in the shed when the loom bangs off; second, when you grip the front half of the shuttle, you are pressing against the binder pin when the pin motion commences, which is a detriment (explained later); third, and better, you gradually check the shuttle, there is no jar and the shuttle will not strike against the front entrance of the box, which is bound to do so under the faulty system.

We were asked the question, which is the better, tight or loose binder? Neither, for one is as bad as the other; a tight binder jars and requires more power behind the shuttle; a loose binder causes a rebounding shuttle.

Sometimes a fixer will tighten a binder and immediately put on more power to drive the shuttle into the box. Of what value is this kind of fixing? We do not mean a shuttle that is picked weak or late, but it is a case of contrary fixing and using a wrench when there is no need for it.

By the appearance of the overalls and jumpers worn by some of the freshmen they must have discovered by this time that cotton fibres are destroyed by acids.

Students, have you met Mr. "Say, girls." If not ask T-yl-r for an introduction.

G-nt has been bothered with his toe nails lately.

C-rt-r must have been very tired to fall asleep during a Chemical lecture.

Wh-t- finds it easy to face "Long, tall ones" in Boston.

West Sixth Street is quite a favorite promenade for some of the students, and quite frequently they are accompanied by the fair sex in that vicinity. But why do some of them indulge in "frankfurts" on their way home.

CONSTRUCTION AND ORIGINATING OF WEAVES.

BY CHARLES G. PETZOLD.

A Text Book for designers, overseers, loom-fixers, web drawers, weavers and others who are interested in the construction of cloth. On receipt of 25 cents, a copy of Parts I and II will be mailed to any address in the United States and Canada. The work is richly illustrated, and the rules for construction of weaves clearly explained. It will consist of two hundred and eighty pages, and about 24 plates of art weaving, and is to be published monthly in twelve parts.

CHARLES G. PETZOLD.

37 Whitman Street, - - - - - Lawrence, Mass.

DESIGNING DEPARTMENT.

This month, we submit to our readers two designs: pattern No. 3, fine worsted trousering, and No. 4, fine worsted suiting.

The half-tone reproduction of the samples of cloth gives a very good idea of the appearance of the woven fabric, but it is impossible in a publication like the Textile Journal to make reproductions in color.

The designs can be worked out in clear finish Cassimeres and will give very good results.

The fabrics are imported and the analysis has been very carefully made. If our readers will put these designs into work, we are sure they will be repaid for the extra trouble. As it is our intention to continue to give designs, drafts and working specifications of foreign samples,

UPTON & GILMAN, MACHINISTS,

587 MIDDLESEX ST., - LOWELL, MASS.

Machines of all kinds designed, drawn and built from rough sketches or constructed from finished plans already made. Correspondence or interview solicited.

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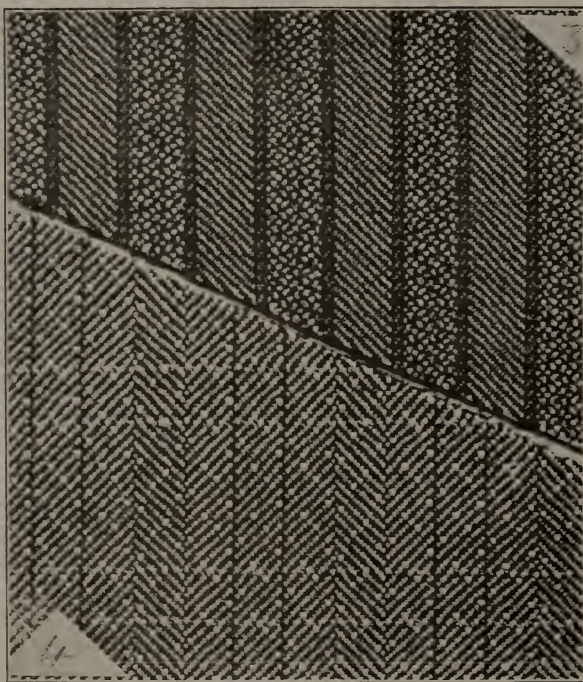
NEW YORK BOSTON
PHILADELPHIA

we can assure our subscribers that the information will be of great assistance to those wishing to know what is being done in Europe.

Next month, the Journal will contain particulars of how to make Golf cloths and one of the best Kerseys on the American market.

PATTERN No. 3.—FINE WORSTED TROUSERING.

A	Worsted, very dark,	2 / 40.
B	“ dark,	“
C	“ twist, light and intermediate,	“
D	“ fancy,	“



Imported European Styles,

WARP.

20 twist C
1 dark B
2 fancy D
1 dark B
24 threads in a pattern.

FILLING.

Very dark A.

SPECIFICATION.

3840 threads in the warp.
15 reed x 4 threads in
1 dent.
64 inches wide.
62 picks per in. in loom.
56 inches wide, finished.
Clear finish.
The design is reduced to
16 harnesses.

MERRIMAC CHEMICAL CO.,

75 and 77 Broad St.,
Boston, Mass.

*Oil Vitriol,
Muriatic Acid,
Nitric Acid,
Acetic Acid,
Acetate of Soda,
Alum,*

MANUFACTURERS OF

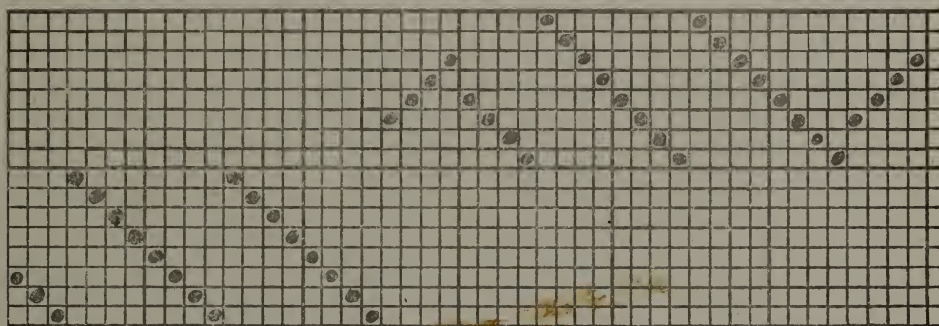
*Sulphate of Alumina,
Chloride of Alumina,
Hydrate of Alumina,
Acetate of Alumina,
Glauber's Salt,
Sulphate of Soda,*

*Bi-Sulphite of Soda,
Hypo-Sulphite of Soda,
Tin Crystals, Etc.
Aqua Ammonia,
Wood Alcohol,
Colors.*

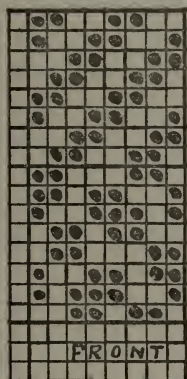
Incorporated 1863.

Proprietors of Wm. H. Swift & Co.'s Works.

PLEASE WRITE FOR CATALOGUE.



Pattern No. 3.—Drawing-in Draft.



Pattern No. 3.—Reduced Chain.

PATTERN NO. 4.—FINE WORSTED SUITING.

- | | | |
|---|---|------|
| A | Worsted, dark shade, | 2/40 |
| B | “ light shade, | “ |
| C | Silk and worsted twist, dark and bright color silk, | “ |
| D | “ “ “ “ dark and other color silk, | “ |

WARP.

FILLING.

- 31 light B
1 twist C
15 light B
1 twist C
16 light B

- 2 twist D
15 dark A
2 twist D
47 dark A
66 picks filling pattern.

64 threads in a pattern.

SPECIFICATION.—3584 threads in the warp.

14 reed x 4 threads in 1 dent.

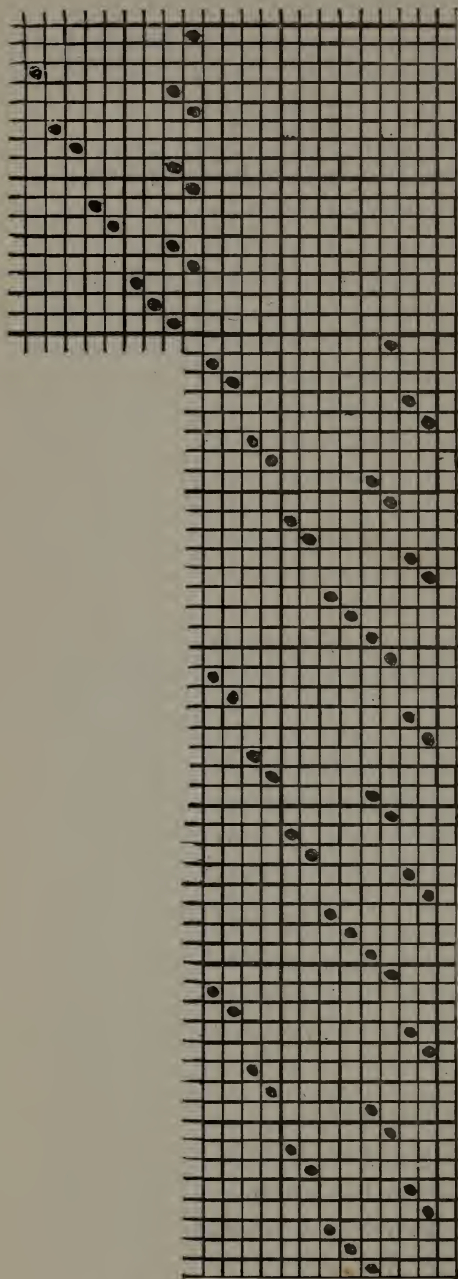
64 inches wide in the loom.

58 picks per inch in the loom.

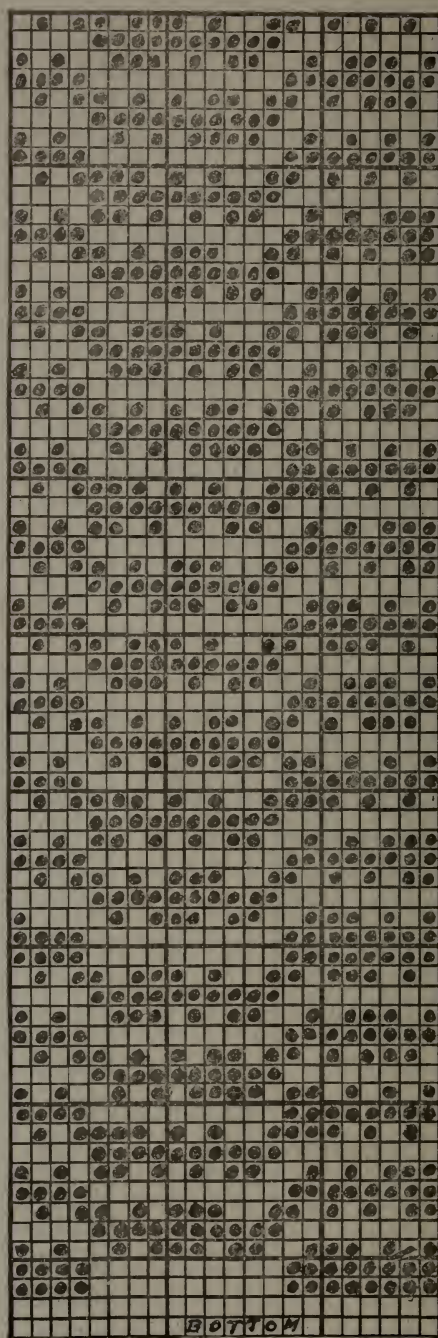
56 inches wide, finished.

Clear finish.

The design is reduced to 22 harnesses.



Pattern No. 4. Drawing-in Draft.



Pattern No. 4 - Reduced Chain.

HISTORIC STUDIES IN HOME FURNISHING.

THE ART OF EMBROIDERY AND LACE MAKING.

By MARGARET AINSLEE.

By permission of the Philadelphia Inquirer. Copyright by Seymour Eaton.

The art of lace-making was introduced into Ireland during the middle of the eighteenth century by a Jesuit who brought thither a piece of Venetian lace as a pattern. On this account much of the needle-point lace done in convent schools is known as "Jesuit lace." In 1846 special efforts were made to encourage the spread of lace-making as a means of support to the famine-stricken populace. Applique, Limerick lace, Irish tatting and Cork crochet lace, known as point d'irlande, have been brought to this country, but the most popular of all is the Irish raised needle-point.

Skill in embroidery having sunk within the last two centuries to the level of a mere accomplishment, it requires some effort for us to realize its former undisputed prominence among the fine arts. When there was no competition with machinery, and individual art, protected by royal patronage, was supplied with abundance of time and the richest materials with which to develop originality and to elaborate detail, then the artists of the

needle were not unworthy competitors of the more generally recognized artists of the chisel and the brush.

Embroidered mummy cloths preserved by Egyptian piety from crumbling to dust prove to us how ancient is this art, even older than pattern weaving. Passages in the Scripture are also numerous in proof that methods of embroidery were well known to the early Jews, who used this form of decoration for the veil of the temple, the adornment of their high priests and their kings.

The early Greeks and Romans always believed the cultured Phrygian and Lydian people to have been the inventors of embroidery, the Roman word "phrygio" meaning embroiderer. To this day the women of this portion of Asia Minor embroider their head coverings, towels, aprons and bodices in the Phrygian bands of animals, rosettes and birds so largely borrowed by the Greeks and Ionians for decorating their pottery. The pictures on Greek vases and the ornamental incisions on the draper-

SHEARS AND SCISSORS

OF ALL KINDS.

SHEARS SHARPENED.

Special discount to Textile Students

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LOWELL, MASS.**TALBOT MILLS,
Woolen Manufacturers
NORTH BILLERICA, MASS.**

ies of Greek statues show great diversity of design, however, proving that this aesthetic nation comprehended the restrictions and the possibilities of the art of embroidery as well as the other arts. Helen and Penelope's accomplishments in this line were sung by the early poets, and upon a Greek vase from Chinsi, Penelope is depicted as ornamenting with richest needlework one of the beautiful robes from her loom. Many of the ancient so-called tapestries have been recently proved to be embroideries; for embroidery presupposes a foundation, and the ancient fabrics clearly show that the ornamentation was stitched through the foundation instead of being woven into its substance, as is tapestry.

Embroideries were used primarily as distinctive marks of a chief's costume, as supplemental to religious ritual and as ingenious intensifiers of feminine charm. These results were obtained by the simplest machinery—a needle and a thread. The primitive needle, regarded merely as the sharp continuation of a pliable thread, was made successively of thorn, fish-

bone, wood, bone and ivory before the present metal form was devised. The primitive thread was undoubtedly wool. The invention of flax fiber for linen has been attributed to Isis, and is mentioned among the vestments of the high priest Aaron and his sons. At the same time cotton from India was brought by caravans to Egypt and the neighboring countries, but does not seem to have been discovered by the Greeks until the time of Alexander the Great, whose descriptions of the apparel of his conquered opponents as made of "tree wool" or "wool growing out of nuts," clearly have reference to cotton. Although silk had been known since 1200 B. C. in China, where it was called "the divine thread," it was the latest filament to come into Europe and was scarcely known there before the time of Julius Cæsar. Long before the introduction of silk embroidery, however, sumptuous effects borrowed from the Orient had been produced by the lavish use of gold and silver threads, which were made by cutting gold leaf into narrow strips and winding it around the

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11 Hildreth Building, . . . Lowell, Mass.

ordinary embroidery thread. The modern Japanese gain this effect very inexpensively by using gilt paper instead of gold leaf. That this gold-embroidered cloth especially commended itself to the barbaric taste of the primitive peoples is shown by its frequent mention as the ideal of richness in the writings of Homer, Ovid, Aeschylus, Virgil and Pliny. David also extols it in the forty-fifth Psalm, where he says of the apparel of the king's daughter: "Her clothing is of wrought gold. She shall be brought in to the king in raiment of needlework."

At the time of the Christian era, Rome, as mistress of the civilized world, imported thither all the wealth and luxury of the Orient.

Rivaling the glory of Cleopatra and Anthony. Augustus imported magnificently embroidered stuffs from Persia and China, and Scipio did not scruple to purchase for the couches surrounding his triclinium or three-sided banqueting table covers of such wondrous Babylonian embroidery that they cost about \$35,000 of our money, and rose so immoderately in value that Nero was glad to purchase them for twenty-five times the original price. As the term of each emperor's reign became more brief the court gave out peremptory commissions of such increasing extravagance that the shuttle, which in normal times might have executed these orders, was obliged to give way before the swifter handiwork of the needle.

A. H. SANBORN & CO.,

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 PHOTO. SUPPLIES,**

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FROST & CO.,

120 Central St., Lowell, Mass.

Why do we advertise? Because it places our name before YOU. If you want good work, give us a trial. A written guarantee with every watch we repair.

Engraving and Jewelry Repairing our Specialty

OTIS ALLEN & SON, LOWELL, MASS.

Allen's Standard Lock-Cornered Filling Boxes,
GENERALLY USED IN THE NEW ENGLAND MILLS.

Roving Cabs, Doffing Boxes, Packing Cases, and Cloth Boards.

WRITE FOR PRICES.



TELEPHONE.

With such gorgeous patterns before them, native artificers were not slow to draw their inspiration from Oriental design, soon producing handiwork which compared favorably, and in originality even surpassed their models. The Byzantine court, shining with the borrowed splendor of Asiatic opulence, soon outdazzled Rome. While the pictorial excellence of Byzantine embroidery was peculiarly appropriate for the draperies commonly hung between the colonnades and porches of cathedrals and palaces, it gave to the articles of clothing for which it was frequently used stiffness instead of dignity, rigidity instead of suppleness. The sacred scenes so exquisitely depicted upon altar cloths were manifestly out of place upon court costumes. The Empress Theodora wore a cloak embroidered with the "Adoration of the Magi," and rich Senators

proudly displayed as many as 600 sacred figures on their robes. It is easy to imagine the delightful curiosity with which the street urchins of Byzantine must have followed such a garment, which, in spite of its pictorial elucidation of the miracles, must have been about as graceful as the advertising boards upon the back of the modern itinerant. What wonder that a righteous bishop of the church inveighed against those "who wore the gospels upon their backs instead of in their hearts!"

About this time the Emperor Justinian devised an expedient for breaking up the silkworm trust, the Chinese having enjoyed an unbroken monopoly of this industry for nearly twenty centuries. To this end he sent two itinerant Persian monks into China, where they so cunningly evaded the vigilance of the natives that they were able

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RUTLAND & SMITH,

195 Middlesex Street,

Telephone 653-5.

Lowell. Mass.



to bring home their hollow staves filled with silkworm eggs. From the rearing of the worms thus craftily brought to Byzantine sprung the European silkworm industry.

During the seventh century the rise of Mussulman power brought a new spirit into waning Byzantine elegance, and as a result the resplendent costumes of the caliphs soon beggared description. The embroiderer's art then extended its province to the exquisite decoration of leather work—boots, saddles, harness and scabbards, as well as the swords and daggers which they covered, being lavishly decorated by the needle-worker. So devoted were nomadic Arab chieftains to beautiful hangings that they invariably carried with them their superbly embroidered tents, one of which the famous Harounal-Raschid sent to Charlemagne in 802.

The adornment of the Kaaba at

Mecca naturally brought forth the very best handiwork of which the worshippers of Mohammed were capable, and to the one who could combine the rarest of tissues with the richest workmanship was accorded the privilege of decorating the prophet's tomb. At times the weight of these votive offerings even threatened to endanger the stability of the temple. To this day it is the custom annually to replace the curtain, a highly ornamental embroidery of texts from the Koran upon the green ground sacred to the prophet of Islam, by a new scroll brought from Egypt upon the back of a consecrated camel. The old curtain is then torn into strips which are distributed as relics to the pilgrims.

To be continued.

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THE LOWELL TEXTILE JOURNAL,
One Dollar per Year.

JOHN DENNIS.

J. NELSON DENNIS.

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S. E. Blanchard, Treas.

"HE HAS GRIT."

When a young man enters the ranks of the Benedicts he takes enormous responsibilities upon his shoulders. Therefore, anything done to lighten that burden can be truly considered charity.

The young Textile School designer whose life has just been brightened is remarkably fortunate in having a large circle of interested friends, who, at this period of his career, could not do too much.

The snug little cottage was selected and furnished, and "all went merry as a marriage bell."

The couple departed as usual for their honey-moon. The next day there appeared upon the house a large placard reading: "We are

on our wedding trip. Will begin the New Year here. John Smith (?) and wife."

Covering the front door was a large sheet of paper which informed the neighbors that the future occupants of this house would return in a few days, and invited all persons interested to "rubber." It then proceeded to show the esteem in which each half of this interesting couple held the other half, and closed with a prayer that the neighbors would not take advantage of their youth and innocence but would welcome them with open arms.

If this happy pair fails to get a cordial reception it will not be the fault of the boys.

THE WILSON Cloth Trimming and Inspecting Machine

GIVES BEST RESULTS AT LOW COST OF OPERATION.

The large number in use in leading mills "Tells the Story" of their success.

Quick Delivery. Write for Quotations.

PERHAM & STICKNEY,

(Successors to Atherton Machine Co.) *LOWELL, MASS.*

F. A. & P. HALL, Cotton and Worsted Machine Builders.

Owing to the death of Mr. Wm. A. Smith, of the firm of Stedman & Smith, and the retirement of Mr. W. L. Stedman, the entire business of the above named concern, including the tools, stock and good will, has been purchased by F. A. and P. Hall of the Bee Hive Spindle and Flyer Works, established by Thomas Hall in 1870. The Messrs. Hall are now the sole builders in the United States of the well known Horrocks Patent Drum Winders (as built by Stedman & Smith) for cotton and worsted.

Drop wires, skewers, change gears, etc., also parts for spinning

frames and gill boxes, furnished at short notice. Our capacity for making Spindles, Flyers, Whirls and Steel Caps (bell mouth or conical) is about doubled, and we respectfully request the continued patronage and confidence of the customers of the retired firm, also thank our patrons for the interest shown us in the past, which we intend to merit from the additional parties with whom we hope to do business in the near future.

Respectfully yours,

F. A. & P. HALL.

Lawrence, Mass.

BORU CLUB NOTES.

Worthy Chief has returned and a meeting will be held shortly after vacation. Look out for notices.

The new House Committee has not been able to make a report, but will do so at the next meeting.

The Westford Division held a meeting the 19th ult. and elected delegates to the next meeting of the club.

Centralville Division will meet February 7th to elect delegates.

D. H. WILSON & CO., Coppersmiths, Plumbers, Steam and Gas Fitters, Sanitary Engineers.

Manufacturers of Slasher Cylinders, Silk and Dresser Cylinders, Color and Dye Kettles. All kinds of copper work for mills. All work warranted satisfactory.

Shop, 279 and 283 Dutton Street,

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INCORPORATED JUNE 4, 1890.

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FACTORIES: Worcester, Leicester, North Andover, Lowell, Mass., Philadelphia, Pa.,
 Providence, R. I., Manchester, N. H., Charlotte, N. C.



Manufacturers of Every Description of Card Clothing
FOR WOOL AND COTTON CARDS.

Smooth, Side, Plough-Ground and Needle-Point. Exclusive American Licensees
 for the Patent Flexifort Card Cloths.

Special attention given to Clothing for Revolving Top Cards. Experts furnished to clothe
 and start the same. Latest and Best Machinery for re-covering Iron Top Flats for Revolving
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Sub Editor, Secretary and Treasurer.

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BY

THE LOWELL TEXTILE JOURNAL COMPANY.

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Journal, and will receive prompt attention.

EDITORIAL.

A young lawyer once complained to a member of the same profession who was a very successful practitioner, that the profession was crowded and that there was but little chance for a young man like himself; whereupon the old and wise lawyer gave the young man a little advice.

He said: "Young man, that the lower stratum of the profession is crowded there is no doubt, and it always will be; but as in all kinds of business, so in ours, there is plenty of room at the top. Get out of the lower ranks and come up higher and you will not be crowded."

While these may not be the exact words of the wise lawyer, they convey the idea actually expressed, and teach a lesson to laborers or professional men.

Did you never notice in an orchard the finest apples and cherries and peaches are always in the very top of the tree and that they are not crowded, but have plenty of room to grow and plenty of air and sunshine and dew and rain to assist in their development?

Do you not know that the upper rooms of a house are the healthiest to live in, because of the pure air and sunshine? But you will notice they are almost always unoccupied, we suppose, it is too much like work to climb the stairs.

HEADQUARTERS FOR

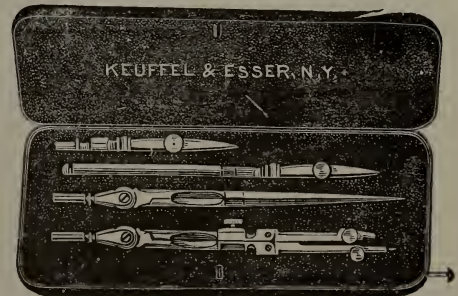
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There are some operatives who are never idle, they always have employment and get good wages, and it is just because they have climbed the stairs and have thoroughly mastered their business; and not only so, they have mastered themselves, and in addition to being proficient in their respective calling, they have trained themselves to be gentlemen and have given some attention to business principles.

They are known to be sober and industrious and well qualified.

Such men do not have to seek employment, but employers have an eye on them and when they wish to change their locations,

positions are open to them. Such men become foremen and eventually the superintendents.

In the lower positions, representing the majority of the operatives, will be found those who are all the time complaining that their ranks are crowded.

They whine that they do not get work to do. The trouble is that they have not the ambition to get up into the place where there is room.

Do you ask how I can get to the top? Begin with yourself, if you have nothing else and be a gentleman. Be sober and honest, and when you find some kind of an

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35 and 36 MASON BUILDING,

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opening go right in and do your best. Slight nothing and do the best it is in your power to do, and you have made several steps toward the upper room. Too many of the craft are given to frequenting the drinking places, and while we are willing to accord to every man personal liberty and all that kind of things we know that employers are not seeking that class of help, nor in just that locality for foremen or superintendents.

Put yourself in the way of employment and you will not only find it, but it will find you.

...

We beg to call the attention of past students to the appeal made by C. J. Brickett, secretary and treasurer of the L. T. S. Alumni Association. Send your subscription along, the secretary cannot carry out his duties without the as-

sistance of others. We know you are willing and ever ready to do your part and that it is only a matter of neglect. "Do not put off until tomorrow what you can do today."

...

If you wish to get the best possible results out of your machinery and materials see to it that they receive proper attention and care, both while in and out of use. Particularly should your machines have proper treatment to make them do their work, and this will also add to the time they will endure and do perfect work. Apply the above suggestion to yourself and those over whom you have charge. If it is necessary to give so much attention to machinery, how much more so is it necessary for us to give proper attention to the help under our management.

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FIRE PROTECTION IN MILLS.

Lecture by MR. E. V. FRENCH of Boston.

Mr. E. V. French of Boston gave a lecture at the Textile school January 16th, on "Fire Protection in Mills." He said among other things: "When a building is destroyed by fire, it is an actual loss, the property is gone and all classes of society are to a certain extent sharers in the loss. In order to sustain insurance companies, every man has to pay a little higher rent than he would if there were no such companies, the cost of every necessity of life is a trifle higher for the same reason, but the tax on each of us is so little that we do not notice it and the benefits are manifold.

"The first idea of insurance was conceived in a rural farm district,

when John Smith, a farmer, lost his barn and his neighbors said: 'That's too bad, poor John has lost his barn,' and at once began to raise a subscription for him to partially repair his loss. But the man who passed the hat for farmer Smith got nothing for his work, while now the insurance company which originated with the hat-passer, gets a certain share for his work and this we all help to pay, so now when a man gets insurance for his burned building the loss and the insurance is more widely distributed.

"In 1900 the loss by fire in this country was estimated at \$140,000,000, and in addition to this the cost of insurance companies was \$45,-

H. E. SARGENT & CO.,

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WORSTED

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CARD CLOTHING,
EGYPTIAN COTTON, Etc.

000,000 and the cost for caring for fire departments was estimated at \$35,000,000, so that the total loss would be \$220,000,000. This means a tax of three dollars on every man, woman and child in this country.

The first thing was to distribute the loss by fire over as wide an area as possible, the next thing in the development of fire protection was to prevent the fire occurring, if possible.

When a man loses his mill by fire, he loses more than the bare property; he loses a great deal of trade, his competitors get business that otherwise would come to him and his business loss far outweighs his bare loss of dollars and cents. In one year a man will lose business that will take him many years to again build up and to a certain extent the man who loses his mill by fire has to begin again a com-

paratively new concern. It is important then for the welfare of society that care should be taken to prevent fire.

"The matter of construction is important; every mill should be open and accessible; there should be no lurking places for fire where it is difficult for water to reach, and every floor should be a horizontal fire wall. There has been a great development along the line of construction of mills, especially as regards roofs."

Mr. French then showed several lantern slides illustrating the development of roofs in mills from the old lantern and barn roof, to the modern flat roof which is common today, and is a better protection against fire.

In the course of his illustrations he showed the roof of a modern church which looked very well on

STUDY

the points of our different machines and compare with others.

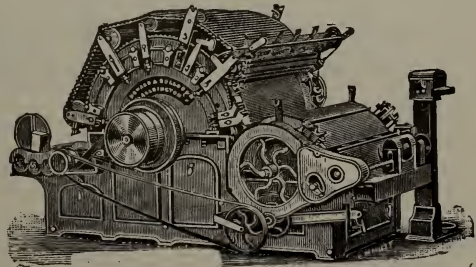
UNDERSTAND

the merits and you will be convinced beyond a doubt of their superiority.

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SCANNELL & WHOLEY,
TANNER STREET, LOWELL, MASS.

the outside but when exhibited inside give evidence of being a perfect fire-trap. "It seems strange," said Mr. French, "that when roof-building on the fire-preventive plan has progressed so much in mill construction that other branches of architecture are so far behind the times."

"The next idea in fire prevention was to remove the hazardous processes away from the main building, so that if a fire breaks out it can be more easily subdued.

"Out of 390 fires in mills in 1900, 329 were in the day time and 70 at night; the loss from the day-time fires was \$290,000 and the loss from the night fires was \$258,000. This shows that a fire at night is generally a more serious matter than one in the day time.

"It is important that everything about the mill should be kept in a

clean condition, dirt around the mule-carriages is dangerous; then again the fire apparatus should be well cared for, and it is very important to know how to use the apparatus.

I have been asked how many pails are necessary in a mill. This would be difficult to say but there is no danger of having too many pails. If a fire breaks out at any time a pail should be within reach of every man and when the first man returns for another pail, there should be several awaiting him in the place where he got the first one.

"The first and most important thing when a fire occurs is to put it out with as little delay and with as little water as possible; good judgment and a level head are essential and the best mill men possess these requisites.

"It takes but a little while to tell

HAMBLET MACHINE CO.,

Successors to Duston Machine Co.

Engineers * and * Machinists.

PAPER CUTTERS.

Special Machinery Built. Repairing attended to Promptly. Pulleys, Shafting, Gearing, Etc.

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PAUL O. KABLE, Assistant.

SUNLIGHT SHOE STORE.

Wear the **Orient Shoe,**

Best \$3.50 Shoe in the World.

100 Central St., ∴ Lowell, Mass.

you of these ideas of fire-protection in mills but it represents a long stage of development and the present substantial fire-preventive mill is the result of actual experience and a process of evolution."

ALUMNI.

We beg to call our subscribers' attention to the "Lowell Textile School Alumni Association. This is an organization which deserves the support of every man connected with the Textile School. The alumni association of any school is one of its most pleasant features, keeping together, as it does, the men who during their school days

were intimately associated in their daily work and who through the force of circumstances have become scattered miles apart. All Lowell Textile School graduates should realize this and join the "Alumni" at once. The dues of the "Association" are one dollar a year, payable in advance to C. J. Brickett, Sec-Treas., 35 8th St., New Bedford, Mass.

Those who subscribe for the "Journal and Design Lectures" do not have so many ups and downs in designing. Let us use the Journal and Lectures for a reduced chain and therefore shorten our work.

SHUTTLE.

WM. E. BASS & CO.,

Manufacturers of

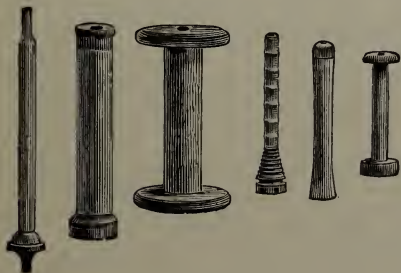
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Of Every Description.

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Full Information will be Sent upon Application.

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Lowell, Mass.

*HEARD OVER THE 'PHONE.*

"Hello! Central. Give me 434-5."

"Line connected."

"Hello! Is this Head No. 1?"

"Yes! Is that you Head No. 2?"

"No one else. The Editor wants copy in tomorrow. Got anything?"

"Yes. I went to the Pollard dance the other night and by appearances it seems that some of the students had accepted the opportunity to become acquainted with our neighbors."

"Who were the fellows?"

"C-rr-n, G-nt, St-rt, Pr-d-l, M-ng-, T-yl-r, Y-ngm-n, Wh-t- and the rest of the dancers. C-rr-n became so well acquainted with one of our fair neighbors that he forgot some of the dances, and the cruel fact that the cars to Lawrence do not run all night interrupted his very pleasant tete-a-tete. What have you got?"

"H-rr-m-n and Bl-m had another session on their trip to Boston, 'building little piles and tearing them down.' As usual Bl-m's pile was pulled down first."

"I called on Hanley about 10.30 the other night and the landlady told me that she had put him to bed a half hour before. It seems that it is a regular thing."

"Ha! Ha! That is a good one on him, but have you heard the one on St-v-ns-n? If ever you want a drink of cider look under the bench in front of his home. He usually leaves a jug of it there until he can get it into the house without detection."

"I hear that 'the midgets' are to race at the next meet in Boston. W-dm-n is practicing daily on the home trainer, and as Sp-g-l does not possess one of those essential features of training, he does the next best thing, and from reports, several flights of stairs in Lowell

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Correspondence Solicited.

are becoming worn out by his constant walking up and down them. R-msd-ll and Arn-ld are to be the pacemakers, but R-msd-ll must be careful at the start, as I have heard that he was placed in a rather embarrassing position while leaving a young lady one evening. B-nn-tt is booked for time-keeper as his ability to be on time is well known. Professor W-dm-n, the world famous trick cyclist, will also perform some of his daring feats."

"I never knew that W-dm-n could perform tricks."

"Then, evidently you have not heard him relate some of his hair-raising acts up at the school."

"Too bad the polo game did not take place the other day. By the way, the scrub team will play the first very soon."

"The scrub team? Who are the players?"

"Some of the best and fastest skaters in the school. The two

R-cks, G-nt, Wh-t-, and W-dm-n, captain and goal tend. Strong combination?"

"Couldn't be better. What has become of our duckpin bowling team? I saw some of the bowlers practising the other night. With such a man as F-rg-s-n, who claims that he 'can average 90 on candles' (?) and G-nt, H-rr-m-n, Arn-ld and P-rk-ns to complete the team it should be ready to meet all comers."

"Cr-g evidently intended to take some pictures of his Chinese converts and was disappointed on arriving home to learn that they had disappeared while he was away. He claimed that he came direct from Springfield and his story was believed, until his camera was received at the school several days later, labelled Boston. 'I wonder why?' That finishes my list."

"Well, call the Editor up if you hear of anything else. Good morning."

"Good morning."

TWO HEADS ARE BETTER THAN ONE.



### *Watch Repairing is my Business!*

And I give careful, painstaking attention to it. I give special attention to the repairing of fine watches—the kind of Watches that need extra careful adjustment. I try to have my work give such satisfaction as will win the confidence of all who leave their Watch repairing in my hands. I want you to feel that when you leave your Watch with me for repairs the work will be done to the best of my ability and in a competent manner. It is my ambition to add to the reputation I think I have in a small measure already established, of doing honest, thorough Watch repairing.

**SAMUEL KERSHAW,**

Note the address,

114 CENTRAL STREET,

Lowell, Mass.



## "COST FINDING IN COTTON MILLS."

The only book published on "Cost Finding." Cloth binding price \$1.50.

FOR SALE BY

**M. G. WIGHT & COMPANY,** MILL SUPPLIES,  
RULING and BINDING.  
67 MIDDLE STREET. Tel. Connection. LOWELL, MASS.

### *KEEP YOUR EYES OPEN.*

You say they are already open. Doubtless you think they are. I have had a conceited idea that none were, and that as I went through the mills, I was drinking in all I possibly could; but one day last week as I was passing a machine, I stopped for a moment to watch the operative straighten out a tangle of yarn. The foreman of this particular section approached and made some slight remark concerning the work. After a few moments conversation I found that this man had, in other mills, gained just the information I had been desirous of obtaining for some time, but had been unsuccessful because I could not formulate the questions to give me the proper answers. He proceeded to explain to me just what I wanted to know, and opened for me an avenue of investigation which may prove of much value and which will certainly pay good interest on the investment, which was but a courteous "good morning."

I have met this man day after day, passing him, so to speak, with my eyes closed. Had he found me before this day, in a more receptive mood, I might have learned earlier what I wished to know.

Make up your mind to learn something from every man with whom you come in contact. Open up! Prepare to be receptive. Expect information from all sorts of surprising places. When you are ready for it you will find it forthcoming.

### *EXCHANGES.*

Aggie Life, Amherst, Mass.  
High School Bulletin, Lawrence, Mass.  
High School Journal, Wilkes-Barre, Pa.  
High School Folio, Flushing, N. Y.  
High School Review, Lowell, Mass.  
High School Gazette, Lynn, Mass.  
The Vidette, York, Pa.  
High School Recorder, Lynn, Mass.  
High School Gleaner, Pawtucket, R. I.  
Gates Index, Neligh, Nebraska.  
The Cue, Albany, N. Y.  
The Distaff, Boston, Mass.  
Res. Academical, Harry Hillman Academy.  
Cogswell Petit Courier, San Francisco.  
Linden Hall Echo.  
The Windmill, Manlius, N. Y.

### *FASHIONABLE TAILOR.*

The new lines for the Spring and Summer of 1901, now ready for inspection, are larger and more attractive than ever before.

**NICKERSON,**

Hildreth Building,

Lowell, Mass.



SAMUEL H. THOMPSON, President.

ELISHA J. NEALE, Treasurer.

# The Thompson Hardware Co.,

IMPORTERS, MANUFACTURERS AND DEALERS IN

## MILL SUPPLIES, TOOLS AND METALS.

All Kinds of Hardware and Builders' Supplies.

254 and 256 Merrimack Street,

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Lowell, Mass.

### THE PAN-AMERICAN EXPOSITION.



HORTICULTURE EXHIBIT BUILDING.

Horticultural exhibits at Buffalo will have a beautiful setting in and about an exceedingly handsome building 220 feet square. The height of the building is 236 feet to the top of the lantern, and the general proportions are of commanding grandeur. Situated in a position of great prominence on the western side of the grounds, the approach from the east is through the esplanade, past the basins of aquatic plants, the fountains and the great urns containing beautiful tropical foliage effects; up the curved incline which is bordered by many odd varieties of

*Lothrop & Cunningham*  
 45 MERRIMACK ST.  
 LOWELL, MASS.

A review of our past year's work shows a most pleasing increase in our business, both in quality and quantity. All our old customers have found us in our New Studio and many new ones have joined them in hearty appreciation of our efforts to give them the very best in photography.

Take Elevator. Tel. 841-3.

GOOD  
**BICYCLES**

CHEAP.

Telephone . . .

**Incandescent Gas Lamps, Mantles, Chimneys and Shades**

BICYCLE REPAIRING AND SUNDRIES.

GEORGE H. BACHELDER,

110 Middlesex Street,

Lowell, Mass.

fruiting trees and shrubs, to the magnificent doorway which is the subject of the accompanying illustration. Probably no horticultural exhibit has ever had such elegant and appropriate surroundings and no former display has been so well worthy of it.

The Horticultural building is connected by semi-circular conservatories with the Graphic Arts building to the north and the Mining building to the south. These conservatories are themselves very beautiful architectural features of the exposition and the fine floral displays in them will enhance their attractions to visitors. They connect the three buildings in this group but are distinct and separate buildings, having their own individual style and their exhibits of entirely different character. The court upon which the three buildings of the group face contains one of the superb Esplanade fountains.

Fruits of all kinds will be placed on exhibition during the summer. Much of the fruit will be preserved in cold storage, though the exhibit will change as the season advances and the different varieties ripen. A number of states have made arrangements to provide collective exhibits that will properly represent the horticultural products of their particular section. California is arranging for a special exhibit of the wonderfully diversified fruit productions of that state. Other states are taking the matter up with the prospect of making the horticultural exhibit the most complete ever attempted. The same care that characterizes other sections of the exposition will be given the Horticultural division with the view of making it representative as to character rather than exhaustive in detail.

Large as the Horticultural building is, it will not contain all the

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Repairing of Watches and Jewelry of all kinds in the best possible manner. Prices right and workmanship guaranteed.

CHAS. W. DURANT,

CENTRAL AND MIDDLE ST., LOWELL, MASS.

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**HAIR, SCALP AND COMPLEXION.**

**Manicuring and Chiropody.**

Hildreth Building,

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**FINE HAIR CUTTING and EASY SHAVING**

Separate Parlors for Ladies.

**HAIR SHAMPOO, 25c**

WEDDING, PARTY AND PHOTO HAIR DRESSING.

Over twenty-five years experience in the business.

Boys' Hair Cutting, 15 cts

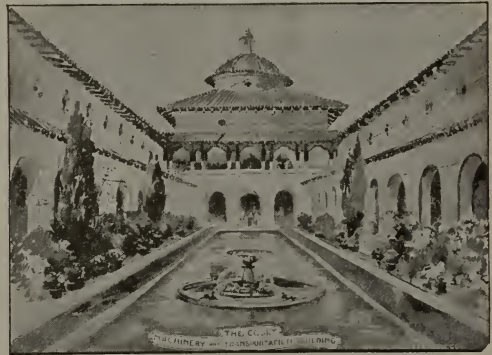
**CURTIN'S, - . - 36 Central Street.**

horticultural exhibits. A plot of ground has been provided extending across the west front of the building on the opposite side of the grand canal, and extending south as far as the Elmwood gate. This plot has been under course of preparation for many months and will present a restful attraction in pastoral contrast to the hum of busy, energetic action which will be so characteristic of other portions of the exposition.

**MACHINERY BUILDING.**

The Machinery building covers an area of about four acres, and will contain a very wonderful display of modern machinery of American invention, showing the progress that has been made within the last few years. The large amount of automatic and special machinery used in American factories and mills will form a most interesting

study to all who are interested in the products of the Western world. The transportation exhibits will include all of the very latest specimens of locomotives, cars and railroad appliances. These will be sheltered in a special building in connec-



tion with the large railway station at the northern end of the exposition grounds. The ordnance exhibits will be made in connection with the machinery exhibits, and will show very remarkable progress in the manufacture of ordnance in the Western world. This depart-

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Special discounts to  
Textile Students at

**LAWLER'S BOOKSTORE,**

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Incorporated 1884

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**Acids, Dyewoods, Chemicals, Drugs**

And Dyestuffs Generally.

38 to 44 Middle St., **LOWELL, MASS.**



L. S. KIMBALL

**Roll Coverer,** AND MANUFACTURER OF  
**Leather Loom Pickers,**

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**LESTER'S DANCING ACADEMY,**

BURBANK HALL.

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| Monday Evening . . . . .     | Beginners.     |
| Tuesday Evening . . . . .    | Advanced.      |
| Wednesday Evening . . . . .  | Intermediates. |
| Thursday Afternoon . . . . . | Children.      |
| Friday . . . . .             | High School.   |

Private lessons by appointment.

ment is distinct from the war and naval exhibits of the Federal Government, and will be sheltered in a special building.



CORNER OF STADIUM.

This picture of a corner of the Stadium shows the massive and beautiful character of the archi-

tecture. This will be a very large structure and during the exposition season there will be held an athletic carnival of particular interest. The entrance to the Stadium is a large building having an arcaded arrangement on the ground floor. The upper floors are to be used for restaurant purposes.

The letter X occurs once in a thousand letters in the English language. In French it occurs five times as often.

97 per cent. of Australians can write their names, but only 60 per cent. of the South African population can do so.

A kangaroo consumes as much grass as six sheep. There are but about 900,000 left in Australia.

France uses more wool than Great Britain—1,250,000 tons to England 1,200,000 tons.

LOWELL TEXTILE JOURNAL,

ONE DOLLAR A YEAR.

Examine This Issue . . . .

Carriages for Weddings, Parties, Funerals,  
and Depot Work.

**Morse Coach Company,**

Stable, 380 Middlesex Street,

Telephone 32.

LOWELL, MASS.



# Lowell Textile Journal

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HISTORIC STUDIES IN HOME FURNISHING.

## THE ART OF EMBROIDERY AND LACE MAKING.

By MARGARET AINSLEE.

By permission of the Philadelphia Inquirer. Copyright by Seymour Eaton.

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Lace, that "most poetic of all textile tissues," has the peculiar charm of intensifying the beauty which it seems to veil. As a fantastic adjunct of dress it has, therefore, appealed strongly to the courts distinguished for their love of personal decoration; and as it is of comparatively modern development, having come into vogue as late as the early sixteenth century, its history is easily studied.

"Lacis," or darned netting, and cut or drawn threadwork are but the transitional forms between embroidery and lacework proper (so closely allied that one seems but an ingenious variation of the other). Lace, in its perfected stage, differs from embroidery which postulates a foundation in that it is a textile fabric in itself, both pattern and ground being devised by the lace-worker. Hand-made lace is divisible into two branches, named—from the method of construction—

needlepoint and pillow lace-making. The former method involves the employment of a needle which loops a continuous thread into various shapes and patterns, thus creating a dainty, sculpturesque effect of gentle relief. The other method produces a softer blending of ornamental effects by means of twisting or braiding together a number of separate threads wound around the heads of lengthened bobbins and fastened in a row upon the cushion or pillow which gives it its name. In its original form it is closely allied to the reticulated weaving or fringe knotting of ancient peoples. In its present form it is said to have been invented in the Netherlands, where it is still one of the chief industries.

The art of lace-making has been followed by women of all classes, providing a graceful pastime for court ladies and an additional sustenance for the peasants, 300,000 of

whom in France to-day eke out a livelihood by this means. As early as the fifteenth century various complicated stitcheries, interlacing devises and designs for indented borders were eagerly sought after; and when the art of engraving and modes of printing made it possible for books of needlework patterns to supersede the samplers which had been insufficient to meet the demand, lace-making became a specialized industry and assumed a more independent individuality.

Fashion, through the introduction of the Medici collar into the French court, soon stimulated the making of lace edges in large quantities. In spite of poetic satire and slighting prose, men and women continued to wear these curious stiffened collars, some of which were a quarter of a yard deep, with twelve lengths in each triple-staged ruff, all edged with narrow lace. Contemporary writers stigmatized them as "garooned like organ pipes, contorted or crinkled like cabbages and as big as the sails of a windmill." Yet people of high degree persisted in wearing them, the Londoners contemptuously terming the collar "the French ruff," while the Parisians invariably alluded to it as "the English monster." Catherine de Medici, who introduced the fashion, imported from Italy a court ruff-maker, to

whom she accorded the sole right of making these trappings. Her son, Henry III, having been trained from childhood with a lively taste for Italian affectations, became so punctilious about his ruffs that, rather than see them limp and irregular, he would launder and goffer both cuffs and collars himself.

Men even more than women adopted the wearing of lace, and thus contributed largely to the making of designs of a distinctly artistic character. Eventually lace figured so largely in the enrichment of court attire that not only great, flat collars, turned-back cuffs, doublets, gloves and breeches were overloaded with cloudy fabrics, but even boots were so adorned.

What wonder that when Henry IV contemplated starting a silk-worm nursery his minister, Sully, with Huguenot austerity, exclaimed, "You want iron and soldiers, not laces and silks to trick our fops!" The exaggerated use of laces spread from articles of clothing to furnishings, to beds, canopies, curtains, even the windows of traveling coaches were so enveloped with these priceless, filmy fabrics that Henry IV passed sumptuary edicts endeavoring to restrict the absurd outlay upon "glitterings and gildings." Nobles nevertheless continued to bring themselves to bank-

ruptcy in their efforts to secure the greatest number of lace novelties, one courtier possessing nearly 400 lace trimmed collars and cuffs. Louis XIII, therefore strove still more forcibly to lessen extravagance by promulgating a severe edict known as the "regulation as to superfluity of costume." A caricature of the grief caused by this edict is shown in the illustration from an engraving by Abraham Bosse.

Louis XIV, on the contrary, did all that he could to develop the

lace industry in France. He sent lace-makers' daughters to the Venetian convents for instruction, and it was not long before the excellent results were shown in the justly celebrated "points de France," which touched the highest point possible to needlepoint laces. The wild caprices in lace-making which distinguished succeeding reigns never surpassed the truly artistic work achieved without regard to cost or trouble, under the protection of the grand monarque.

*To be continued.*

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## MANUFACTURE OF TEXTILE FABRICS IN RUSSIA.

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During the long winter in Russia the peasant men and women employ themselves in weaving linen canvas, etc., etc. They spin the thread in the ancient manner with the distaff and with the spinning wheel. The product of their winter industry is either bought by dealers, or women carry it about and offer it for sale in the same manner as the hawkers of Irish linen did formerly in England. The linens of Russia, although excellent in quality, lack the finish which is imparted to the Irish, Belgian, and German linens, which form an important article of

import. The foreign linen trade in Russia has acquired notoriety for the unscrupulous manner in which the goods are advertised in the newspapers, displaying the most extraordinary puffing announcements and giving one anything but a favorable opinion of the sellers. In heavy goods, such as sail cloth, raven ducks and crash, England cannot compete with Russia, and these articles, owing to their superior quality, find a market in this country. The well-known article called crash (a corruption of the Russian designation *kriastch*, gristle) is packed

in bales of 1,000 archine, of 750 yards, or in half bales, and is distinguished by the following names and numbers: the superior qualities, mejeomck or M's, Golofka or G's, and first, second, third, fourth, and fifth qualities. It is perhaps not generally known that the manufacture of textile fabrics in Russia has reached a high degree of perfection and excellence. It is only the finer quality of goods, and mostly those that are subject to the changes of fashion, that are imported from abroad. Some of the higher qualities of woollens are equal to anything manufactured in England.

The official report of the goods exhibited at the several industrial exhibitions held in Russia within the last ten years gives the following estimate of them: (1) The woollens and worsted articles were very numerous and of excellent quality. (2) The muslins were remarkably fine and the patterns light and tasteful. (3) The prints and chintzes were also remarkably good. We may note here that the cotton prints for the home and Asiatic market manufactured in Russia undergo an unusual amount of calendering, a bright gloss being indispensable. (4) The silk goods were abundant and of fine quality and colors. Among them may be specially noted the magnificent tis-

sues of silk interwoven with gold and silver thread for ecclesiastical vestments, gorgeous alike in material and in richness of design. We may remark that foreigners, without any veneration of things sacred, purchase largely of this cloth of gold and silver for the purpose of making window curtains and covering drawing room furniture. Much of this is extremely beautiful in design and workmanship. From the numerous patterns, many of which are commonplace and gaudy, there is no difficulty in selecting specimens of genuine old Byzantine ornamentation. (5) The velvets and carriage lining silks and furniture silks were magnificent. Of the latter, one firm are said to sell annually 2,000 pieces of furniture silk for English consumption, the designers and workmen employed on which are exclusively Russian. Not only the richer description of goods, but plain silks and satinettes appeared excellent in color and quality and moderate in price. Ribbons have not as yet attained equal perfection; the supply is obtained from France." It has been stated, on Russian authority, that so well developed is the Russian silk manufacturing industry that considerable quantities of Russian silks are sold in various markets of Southern Europe as Lyons silks. Foreign goods are consumed only



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**CHARLES G. PETZOLD.**

*37 Whitman Street, - - - - - Lawrence, Mass.*

by the wealthier classes of Russia. England exports to that country the finer quality of cottons in great variety, woolens (principally heavy goods and fancy trouserings), and Irish linen. In silks there is very little done between the two countries, France supplying this article almost exclusively, especially ribbons, as we have just stated. Among the articles of English manufacture imported into Russia may be mentioned carpets, chiefly velvet pile, which are found in the houses of the wealthy only, like English fire places. As a rule, the fashion of parquette floors, which, when well polished, is in itself highly ornamental, precludes

the necessity for carpets covering the whole of the room; a good-sized square carpet of velvet pile in the drawing room is all that is required. There are a few manufacturers of carpets in Russia, both of velvet pile and Brussels. Tapestry carpets are also made from imported English yarn. The patterns are mostly copies of English designs, and the prices are very high. Felt carpeting has had a good sale in Russia, owing to the low duty on that material. Among the miscellaneous articles exported from this country to Russia may be mentioned, silk hats, Scotch caps, traveling rugs, plaids, umbrellas, woolen gloves, neckties, per-

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fumery, etc. Kid gloves are extensively manufactured both at St. Petersburg and Moscow, principally by French firms employing Russian workmen and workwomen. Large quantities are made of so-called lamb kid.

The prices of the best goods are about the same as they are in London. Latterly, the manufacture of gloves from reinder-skins, prepared like wash leather, has received a considerable impetus in Russia.

What is termed haberdashery and small wares is nearly all imported from England and Germany, there being only a few native manufacturers of these articles in the capitals and in the interior.

Gentlemen's and ladies' under-clothing for the middle and upper classes is made entirely of Irish and German linen, in which the most exquisite taste is displayed. The stocking manufacture is almost unrepresented in Russia. It is only the middle and upper classes that wear this article, which is chiefly imported from England and Germany; the peasantry, who form the bulk of the population in Russia, are stockingless, the covering adopted for the feet and legs being linen swathings.

Signed,            FACTS.

Where is that second year class pin? Get together, boys, and hold a meeting.

---

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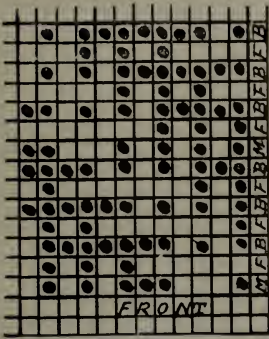
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A Alizerine Blue, B Black, C Cadet mixture,  
D White, E Yellow, F Royal Blue, G Black  
Worsted.

A B C D E F 2 1-2 run woolen, G 2-40  
Worsted.

| 1 | Thread | G, 1 | Thread | A, 1 | Thread | C, 1 | Thread | A, 1 | Thread | C, 1 | Thread | A, 1 | Thread | C=7x14=98 |
|---|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|-----------|
| 1 | "      | G, 1 | "      | A, 1 | "      | E, 1 | "      | A, 1 | "      | E, 1 | "      | A, 1 | "      | E=7x 2=14 |
| 1 | "      | G, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B=7x 6=42 |
| 1 | "      | G, 1 | "      | A, 1 | "      | E, 1 | "      | A, 1 | "      | E, 1 | "      | A, 1 | "      | E=7x 2=14 |
| 1 | "      | G, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B=7x 5=35 |
| 1 | "      | G, 1 | "      | A, 1 | "      | D, 1 | "      | A, 1 | "      | D, 1 | "      | A, 1 | "      | D=7x 4=28 |
| 1 | "      | G, 1 | "      | A, 1 | "      | C, 1 | "      | A, 1 | "      | C, 1 | "      | A, 1 | "      | C=7x 5=35 |
| 1 | "      | G, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B=7x 3=21 |
| 1 | "      | G, 1 | "      | A, 1 | "      | C, 1 | "      | A, 1 | "      | C, 1 | "      | A, 1 | "      | C=7x 5=35 |
| 1 | "      | G, 1 | "      | A, 1 | "      | D, 1 | "      | A, 1 | "      | D, 1 | "      | A, 1 | "      | D=7x 4=28 |
| 1 | "      | G, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B=7x 5=35 |
| 1 | "      | G, 1 | "      | A, 1 | "      | E, 1 | "      | A, 1 | "      | E, 1 | "      | A, 1 | "      | E=7x 2=14 |
| 1 | "      | G, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B, 1 | "      | A, 1 | "      | B=7x 6=42 |
| 1 | "      | G, 1 | "      | A, 1 | "      | F, 1 | "      | A, 1 | "      | F, 1 | "      | A, 1 | "      | F=7x 2=14 |
| 1 | "      | G, 1 | "      | A, 1 | "      | C, 1 | "      | A, 1 | "      | C, 1 | "      | A, 1 | "      | C=7x14=98 |

553

553 threads x 7 sections=3,871 threads in warp.

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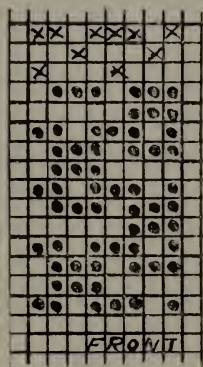
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|   |        |    |   |        |             |
|---|--------|----|---|--------|-------------|
| 1 | Thread | A, | 1 | Thread | C=2x111=222 |
| 1 | "      | A, | 1 | "      | F=2x 6= 12  |
| 1 | "      | A, | 1 | "      | B=2x 26= 52 |
| 1 | "      | A, | 1 | "      | E=2x 6= 12  |
| 1 | "      | A, | 1 | "      | B=2x 24= 48 |
| 1 | "      | A, | 1 | "      | D=2x 12= 24 |
| 1 | "      | A, | 1 | "      | C=2x 21= 42 |
| 1 | "      | A, | 1 | "      | B=2x 12= 24 |
| 1 | "      | A, | 1 | "      | C=2x 21= 42 |
| 1 | "      | A, | 1 | "      | D=2x 12= 24 |
| 1 | "      | A, | 1 | "      | B=2x 24= 48 |
| 1 | "      | A, | 1 | "      | E=2x 6= 12  |
| 1 | "      | A, | 1 | "      | B=2x 26= 52 |
| 1 | "      | A, | 1 | "      | F=2x 6= 12  |

626



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**"CRACK'EM."**

B-nn-tt suddenly decided to move, but the landlady thought that she deserved a notice, so she held his trunk.

H-rr-m-n is taking in the vaudeville lately from the profits of his recent transactions with Bl-m.

C-rr-r is taking vocal lessons from a young lady.

The gloves have made their appearance, and blood has been drawn. Many warm times are expected.

When the cast for Prof. Olney was made the letters were made to read correctly, but when the cast was viewed—what a difference! They were discovered to be reversed.

"Rip" favored the "sleigh riders" with one of his favorite buck and wing dances, but unfortunately he mistook a patch of ice for bare ground, and the result was disastrous for him.

St-w-rt is quite a singer, but Windham, N. H., air was bad for his voice.

Sp-g-l is quite a piano player, and is well acquainted with classical music. His many arguments lately have interested (?) his listeners.

It is sometimes not advisable to throw unused envelopes in a waste basket, especially if they contain the addresses of young ladies who make the envelopes. For information on this subject consult Arn-d.

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G-nt is frequently seen on the Andover Street bridge, looking at his hat, which is "lost to him forever." Nit.

Who is the 6 feet 3, heavy-weight, who sat on a chair, and nearly caused two Westford Street students to change their boarding place? Ask Cr-ig.

About 30 per cent. of the freshmen passed in Chemistry examination, which is a record to be proud of.

A red hat with black bands has a great attraction for F-rg-s-n.

F-ll-r finds that landladies object to being awakened in the wee small hours. Next time, take your key.

C-rr-n should take Hood's Sarsaparilla for that tired feeling.

"How are you this morning, F-rgy?" "Rocky."

"Spider" did not enjoy his cold-water bath.

There was a full attendance of the "back row" at the last Weaving lecture.

During recess, you may see R-d-l in the field, trying to gather buttercups.

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“W”.

At the meeting of the Boru Club, held on Monday, Feb. 4, it was voted that the club be formed into an organization, the object of which would be the advancement of its members in school work. At the meetings, the second and fourth Wednesdays of each month, the members will have an opportunity to freely discuss the work, and it is believed that much good will be the result.

The symbol “W” stands for Work, and it can also be read double U, “Umpleby’s Understudies.”

Vale, Boru Club!

The “Two Heads” have been unable to complete their article on “Student Life,” owing to pressure of work, but they will be able to present it in the April number of the Journal.

One of our present students was nearly expelled at one of the schools attended by him for reading the following essay on “Pants”:

“Pants are made for men, and not men for pants. When a man pants for a woman, and a woman pants for a man, they are a pair of pants. Such pants do not last long. Pants are like molasses. They are thinner in hot weather, and thicker in cold. The man in the moon changes his pants during the eclipse. Don’t you go to the pantry for pants, you may be mistaken; men are often mistaken in pants; such mistakes make breeches of promise.

“There has been much discussion as to whether pants is singular or plural; seems to us when men wear pants they are plural, and when they don’t wear any pants it is singular. Men go on a tear in

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their pants, and it is all right, but when the pants get on a tear it is all wrong.

## HOSPITAL LAB.

The list of invalids has been materially decreased by the recovery of Prof. Umpleby, Stratton, '02, and Snelling, '03. Lincoln, '02, will be unable to return this

season, but it is hoped that he will be back next season.

Youngman, '02, is detained at home by a severe cold.

"Moore" Parker, '01, was another of the unfortunates, but has recovered without losing any flesh, for which he is thankful.

Prof. Barker was away from school on account of his wife's recent illness.

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## EDITORIAL.

In running a mill it is a difficult matter to lay down a rule or system applicable in every case, when we consider the variety of minds we have to control. We should employ every possible means to bring the help up to a higher state of knowledge of their work, as a means of success; it requires hard

work as well as brains to be a successful mill manager. In my own experience I have found that carelessness is a great evil in mills; a sort of "don't care" spirit prevails with too much of the help in mills of the present day. Now this is all wrong, both for the help and the success of the mill; a judicious manager will feel an interest in his help. The mill help of today are not looked upon by intelligent people as following an occupation only fitted for a certain class, but as a *science of great importance in the foundation of wealth and prosperity of the country.*

(It is only necessary for the people to visit our Textile Schools and see what the Treasurers, Agents and Superintendents of the most successful corporations are doing for the benefit and advancement of the help in their respective mills.) The most successful mills in this country are those that take a deep interest in their help. I know of a number

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of mills where "bummers" never think of going to find work; then I know of other mills where nearly any "bum" can obtain a few days' employment. Who is to blame for this state of things? I boldly say the agents, superintendents and owners.

I know human nature is a puzzle, and the older I grow the more I am satisfied that it is unsolvable, but we have it to contend with in all business, as well as the mill business.

Now, I say a man that understands how to run a mill successfully must be a man who understands human nature; and a practical man of business; one

who looms up right and square. Such a man all the overseers will respect—for he will always have good overseers, and if they get into trouble they will not try to cut and cover up things, but will go at once to the agent or superintendent, and make an explanation. It makes no difference what the difficulty is, it will be all made right in a very short time, for they understand the business, and each of them take pride not only in the one room, but in having the whole mill run smoothly. Such overseers are not dogged from morning until night by an incompetent agent or superintendent.

The point which I wish to make

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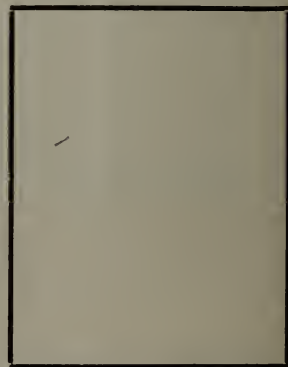
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is, that no mill can succeed without a good, honest, upright man at the head of it; a man with a good backbone, and a will-power which he knows how to control. You will say that no man can run a mill without good overseers; that is true, but such a man will always have about him good men, for he has a good knowledge of them, and will recognize the rights of all.

In my thirty-five years' experience, I have gone through all of the annoyances of mill life, from a picker boy to superintendent, and I would like to ask if the designer and overseers don't have their share of troubles in a mill? No mortal man—unless he has been there—can have anything like a clear conception of the feelings and anxieties of an overseer when things are going all wrong; and, when everything is all right, I think he is the happiest man in the world; he will go home at

night and meet his wife and children with a smile on his face, and where can you find a more jovial or happier set of people than the successful mill men of New England?

To the young men just starting in mill life, I say, be careful of the company you keep, and the books you read. A man is known by the company he keeps, and the books he reads. By all means, take the textile papers: you will always find something good in them.

You do not need to have any rich relative to back you up, the best backer you can have is your hands and a level head—full of brains. You do need friends, and you can make them without costing a cent. If you are working under a good overseer, and doing your level best, he will be the best friend you can have, for good overseers like good help.

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It is always the poor, weak overseer, who prefers ignorance to exist in his room, and he is the man that will snob the one seeking knowledge, and ridicule the even-ting te tile school; he feels his own weakness and ignorance, and he is like the jelly-fish—can only absorb and float.

I never saw an overseer who was not up in his business but was afraid that some one in his room would gain some knowledge of the business, and would be trying to better his position, the poor overseer becomes jealous and overbearing.

Five and one-half pounds is the average weight of the wool from a sheep's fleece.

The United Kingdom makes 300,000,000 yards of linen a year; France, 320,000,000.

Less than one-fifth of Ireland's population speak the Irish language.

Gold-beaters, by hammering, can reduce gold leaves so thin that 282,000 must be laid upon each other to produce the thickness of an inch. They are so thin that, if formed into a book, 15,000 would only occupy the space of a single leaf of common paper.

The first typewriter patent was taken out in 1714.

The first industrial exhibition was held at Nuremberg in 1569.

Diamond, sapphire, milky ruby, red ruby, garnet, and aquamarine are used in watch-making.

Shamoy leather is not, nor never was, the hide of the chamois, but the flesh-side of sheepskins.

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Blacksmiths' aprons are made of sheepskin, tanned with alum, which renders them heat-proof.

In ruling paper, the worker using quill and ruler, seventy years ago, took 4,800 hours to do the work now done by machine in two and three-quarter hours.

Madame Patti has for some time held the record for the highest sum that has been earned in a year by a woman, her total for one period of twelve months having been \$350,000.

In some Italian towns, instead of giving books as prizes in public schools, they give savings-bank books, with a small sum entered to the credit of the prize-winner.

Jack: "I say, Jim, why aren't you calling on Miss Jones any more?"

Jim: "Don't ask me, Jack. The reason is a parent."

The word "sterling" is really "Easterling." The purity of the metal made by the Eastern Germans was famous in the twelfth and thirteenth centuries.

Britain owes her tramway system to an American, George Francis Train. The first tram-line was opened at Birkenhead, August 30, 1860.

When a woman has a secret,  
Although she may not show it,  
She's just as angry as can be,  
If no one wants to know it.

Teacher: "If one man can perform a piece of work in six days, how long will it take six men to do it?"

Willie: "About six weeks."

Teacher: "How do you make that out?"

Willie: "Six men would get up a strike."

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the points of our different machines and compare with others.

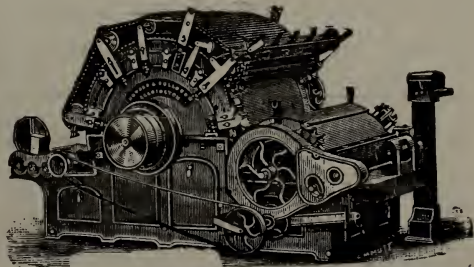
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the merits and you will be convinced beyond a doubt of their superiority.

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The goods produced are practically equal to Cottons patent work. The Maximum machine is unique in the following respects :

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2. It produces as much fabric of a narrow width as of a wider width.

3. It produces a quantity of fashioned spliced goods equal to the production of the cut circulars, and there is no waste in cutting out.

After arriving at the desired width, the three actions—the expanding traverse, the decreasing speed, the extra needles brought into work by widening—being all geared up together, are wound

back by the operator by the turn of a wheel to the width it is desired to begin on. Thus the traverse is reduced, the speed increased accordingly, and the extra needles brought into work by fashioning are thrown out of work.

When the fabric attains its full width, unless the fashioning lever is raised—thus making straight work—the machine will stop automatically, so as to prevent over-fashioning.

Six machines have been in operation here for six month or so, and considerable quantities of goods have been placed on English and colonial markets. Patents have been taken out here, in Germany, France, Canada, and the United

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*CONE AND* **WINDERS** *AND* **TUBES** *FOR*  
*TUBE* *PAPER* *SAME.*

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PAUL O. KABLE, Assistant.

SUNLIGHT SHOE STORE.

Wear the Orient Shoe,

Best \$3.50 Shoe in the World.

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States; and the latter, I believe, are for sale. The company's address is the Maximum Knitted Underwear Company, Thornton street, Nottingham.

THE BETTNEY SPLICING MECHANISM.

This improvement was invented by H. A. Bettney and is now represented by C. W. Hammersley, Brougham Chambers, Wheeler Gate, Nottingham. It has been in practical use for about a year and is built by Messrs. Blackburn & Sons, of this city, under a royalty. American rights are still unsold.

The invention consists of an improved splicing mechanism applicable to circular bearded needle knitting machines of this kind often

known as web heads and making a web which is largely used for vests and pants (undershirts and drawers.) To each feeder on the head, a splicing mechanism is applied. This comprises a bladed wheel with blades specially cut to insure the thread being thrown in and out of action at particular needles. There is also a thread cutter and a holder for securing the cut ends of the thread. The splicing thread is thrown into and out of work by a cam on the needle cylinder, this cam being arranged according to the number of feeders, while the number of courses spliced is controlled by a single pattern cam mechanism.

The improved mechanism can be applied to machines fitted with

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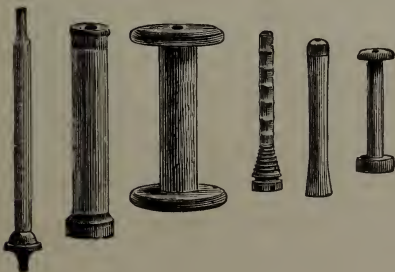
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Full Information will be Sent upon Application.

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two or more feeders and is also applicable to existing machines, this being a great advantage over most other splicing mechanisms which are adaptable to one feeder only. Many hosiery manufacturers have had the improved mechanism fitted to their machines, and are fully satisfied with the accuracy of its work and the speed at which the machine can be run.

### WOOL SCOURING IN FRANCE.

W. P. Atwell, United States Consul, writes :

Having read a most interesting article by Mr. Vandenbosch, engineer in a spinning mill at Wambrechies, on the Malard wool-scouring machine, I sought the author and obtained from him a description of this, which I think may be of interest to American wool combers and spinners.

The machine serves a triple purpose. It scours perfectly, elimi-

nates from the wool secretions from which industrial potash is obtained and thus renders the water that passes off into streams less poisonous. The complete purifying of the waste water may be affected by the addition of less acid, as the acid is not neutralized by the presence of salts of potash.

The machine is an invention of Mr. Georges Malard, a Tourcoing engineer, and has been patented in France and other countries, including the United States. It is largely used in France, some combining establishments producing annually more than 1,000,000 kilograms (2,204,600 pounds) of potash obtained from wool grease and selling it at prices ranging from 35 to 40 francs (\$6 75 to \$9.46) per 100 kilograms (220 pounds) of carbonate. This potash is obtained from the soluble grease secreted in the raw wool, that is run off in the scouring process in juice or concentrated liquid,

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Wool Washing Machines, Wool Dryers, Wool Waste, and Rag Dusters, Duplex Burr Pickers, Waste Cards, etc. Write for information concerning our new automatic Cotton Dryer.

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-

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having a density of 12° to 13° Baume areometer (corresponding density, 1.0744 to 1.099).

This liquid is evaporated and calcinated in special ovens made of masonry and leaves a saline residue of spongy form and gray blue in color. This product is known as wool potash and contains from 75 to 90 per cent. of carbonate of potash and very little soda.

It is much used in this consular district in glass works, the manufacture of soap and chemical products, in the preparation of refined and caustic potash and in the manufacture of prussiate of potash. It has thus great commercial value.

The Malard scouring machine is very simple, requiring neither cellar, cistern, nor upper story like the old machines. It is movable, works on a level and being automatic requires no special superintendence. One

workman can easily feed several machines that extract the grease, and consequently several washing machines, since the wool leaving the first machine falls directly into the first tub of the second, or washing machine which may be of any pattern. The wool is first spread on an open-work metal plate of about six meters (6.5 yards) in length and carried over this to the first washing bath. The plate is of malleable sheet iron and serves to carry the wool in layers of 25 to 50 centimeters (.8 to 19.6). It is the invention of Mr. Paul Malard, of Tourcoing. It is extremely solid, holds its shape and lasts indefinitely as it offers the maximum of resistance. It is manufactured in different styles and can be used in many machines requiring continuous motion. This plate is placed over a vat divided into six

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And I give careful, painstaking attention to it. I give special attention to the repairing of fine watches—the kind of Watches that need extra careful adjustment. I try to have my work give such satisfaction as will win the confidence of all who leave their Watch repairing in my hands. I want you to feel that when you leave your Watch with me for repairs the work will be done to the best of my ability and in a competent manner. It is my ambition to add to the reputation I think I have in a small measure already established, of doing honest, thorough Watch repairing.

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RULING and BINDING  
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compartments, which is placed next to the receiving tub of any washing machine.

A battery of centrifugal pumps puts in motion a small quantity of the liquids contained in the compartments, so that they moisten and pass through the layer of wool, eliminating its grease. The wool in its progress receives each one of the dissolvents, the strength of which decrease in regular proportion as the wool reaches the point from which it passes into the receiving tub.

The pumps are worked by a single belt and are started into action simultaneously with the plate by a single turn of the gear.

An ingenious mechanism produces the automatic evacuation of a variable amount of the first grease drippings, when sufficient density is obtained. Hinged valves worked by floats constantly maintain a high level in each of the compartments

of the machine, so that they neither overflow nor get empty.

The automatic passage of the liquids from one compartment to another is obtained by means of these hinges. This passage is regulated as required and is in an opposite direction from the movement of the wool.

A very simple and absolutely sure contrivance regulates the supply of warm water for rinsing. This water, which takes the last alkaline traces from the wool, then passes into the last compartment of the machine. Its flow is constant, as it must supply the loss of liquid sustained by the receiving compartment which pours the liquid through succeeding compartments by means of the valves spoken of above.

The automatic operation of the machine regulating the duration of the cleansing process, preserves the strength of the wool and gives

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a clearer white. The wool is impregnated successively with liquids that lose in alkaline properties as they gain in heat, until the wool reaches the temperature of the first washing bath.

The Malard machine permits absolute cleansing or partial cleansing to any degree desired. All of the wool may leave the machine carrying a portion of grease regularly distributed, or it may be absolutely freed from the grease that clings to its filaments, by means of six liquids of decreasing density ( $12^{\circ}$ ,  $9^{\circ}$ ,  $7^{\circ}$ ,  $5^{\circ}$ ,  $3^{\circ}$  and  $1^{\circ}$  Baume), then by rinsing in warm water.

The liquid products are usually  $2^{\circ}$  greater in density than in other modes of extraction, and this can readily be raised to  $10^{\circ}$ , even with lamb's wool not rich in fatty matter. This is regarded as a great factor, in view of the constant rise in price of coal.

Australian wool gives about 160 grams of carbonate of potash and fine qualities of Buenos Ayres, as high as 190 grams to each kilogram of combed wool.

The Malard machine has a capacity per day of ten hours, 4 to 9 cubic meters (141 to 318 cubic feet) of grease,  $12^{\circ}$  Baume, according to the kind of wool and capacity of washing tub. Each cubic meter (35.36 cubic feet) yields about 78 kilograms (172 pounds) of wool potash, selling for about 15.50 francs (\$2.99 per meter).

### FRENCH WOOL INDUSTRY.

W. P. Atwell, United States Consul, writes:

The supply of washed wool for the French industry was 88,000,000 kilograms (194,004,800) in 1890. This figure has varied somewhat in the last ten years, being 105,000,000 kilograms (231,483,000 pounds)

*Lothrop & Cunningham*  
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in 1893, 109,000,000 kilograms (240,301,400 pounds) in 1896, and only 103,309,000 kilograms (227,755,021 pounds) in 1898.

France makes a specialty of combing, and possesses a number of large establishments, particularly in the Department of the North. She exports a large quantity of combed wool, and the export is constantly increasing, rising from 7,765,000 kilograms (17,118,719 pounds) in 1890 to 19,062,000 kilograms (42,024,085 pounds) in 1898. Her best customers are Russia, Germany, Belgium, and Spain. The home consumption has decreased somewhat, on account of the removal to other countries of several spinning establishments, which however, still buy their combed wool in the French market.

French mills produced 68,191,000 kilograms (150,333,878 pounds) of wool in 1898, valued at about 500,000 francs (\$96,500,000). 5,220,-

000 kilograms (11,508,012 pounds) of this production—viz., one-sixth of the amount—was exported.

There were imported 1,933,500 kilograms (4,262,594 pounds) of woolen yarns and 765,000 kilograms (1,686,519 pounds) of hair yarns; also 20,000,000 kilograms (44,092,000 pounds) of shoddy and mixed yarns—making about 85,700,000 kilograms (188,934,220 pounds) of yarns for the use of French weaving establishments. These establishments make many and varied goods.

The principal centers for cloth manufacture are Roubaix-Tourcoing, Sedan, Elbeuf, Rheims, Vienne, Mazamet, and Chateauroux. Combed wool cloth and cheviots are principally made in the Department of the North. According to the customs' statistics, the cloth production in France amounted in 1897 to 206,000,000 francs (\$39,758,000).

Roubaix and Tourcoing manufacture armure goods, jacquards, satin de chine, and a great quantity of novelties.

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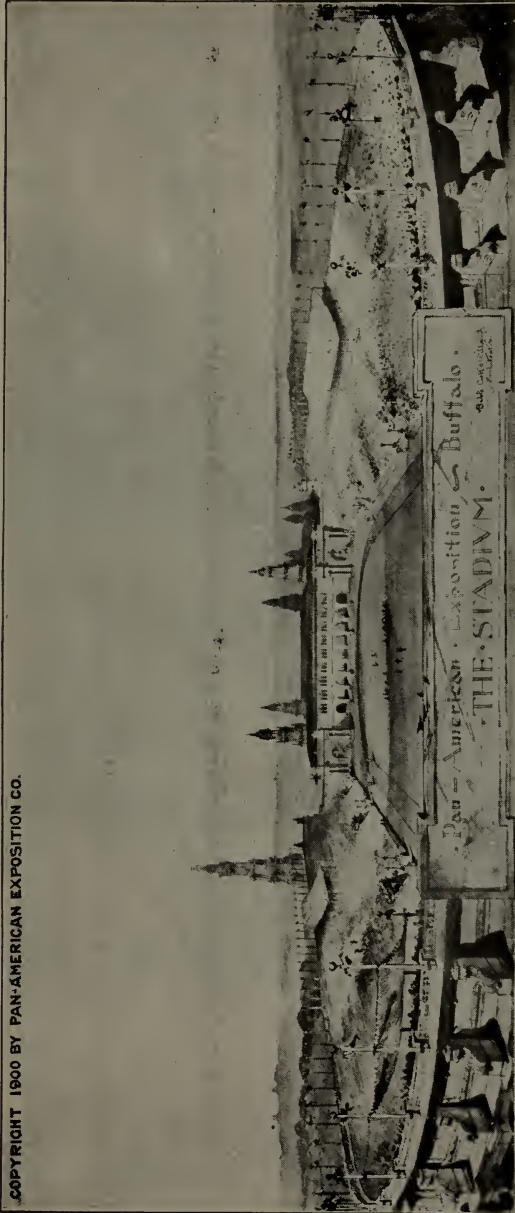
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**STADIUM.**

In the Stadium will be seats for 12,000 people. It contains a quarter mile racing track and ample space for all the popular athletic games. Here also will be the displays of live-stock, automobiles and other road vehicles, farm and road machinery in motion. The large space beneath the seats will be used for exhibits.

The first elevator was made at Schoenbrunn, then the summer residence of the Austrian Emperor, in 1760. It was called the flying chair.

The area of London is 688 square miles (metropolitan district); New York, 306.01; Chicago, 180.12; Philadelphia, 129.33.



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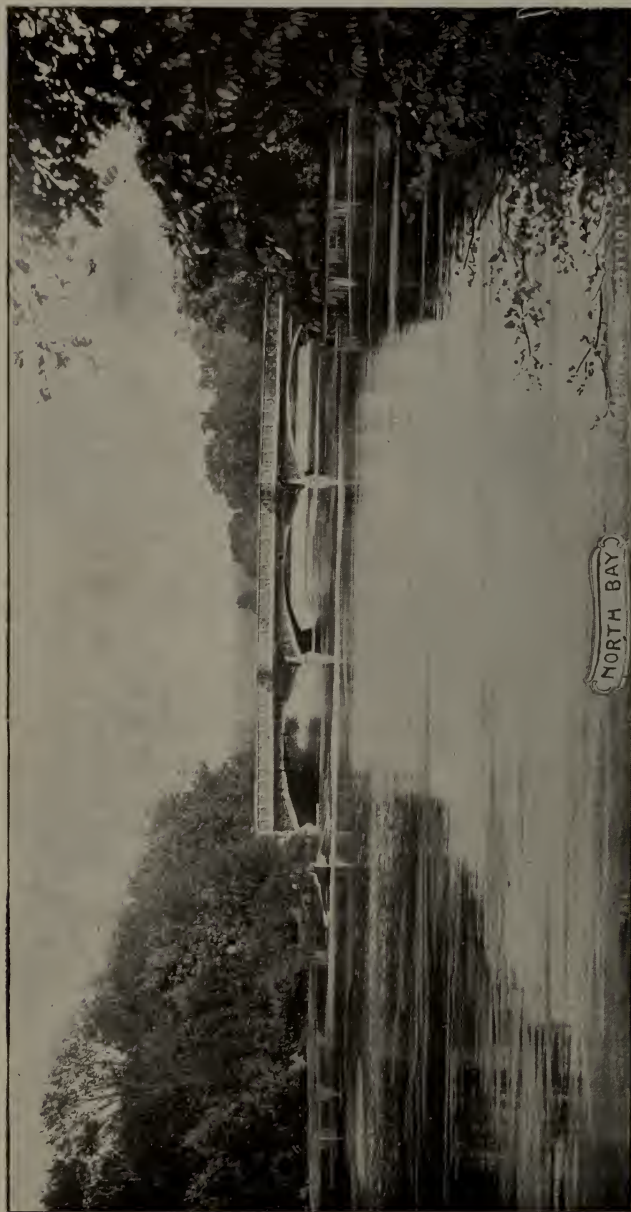
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| Intermediates | Wednesday.     |
| Children      | Thursday P. M. |
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Private lessons by appointment.



NORTH BAY.

The North Bay, which forms a part of the lake in Delaware Park in the Exposition grounds, is particularly interesting from the fact that upon its shores will be situated the Albright Art Gallery and the New York State Building, upon opposite sides. It will help to form a very beautiful setting for these splendid structures. A magnificent new bridge is being constructed, and over this bridge the visitor will pass from the main southern entrance of the Exposition to the great group of buildings north of the lake.



# Lowell Textile Journal

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## WATER POWER.

ABSTRACT OF LECTURE DELIVERED BY MR. ARTHUR T. SAFFORD, FEB. 27, 1901.

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The use of water power has been universal for centuries and probably always will be, and many mechanical principles employed in the building of water motors and water wheels were as familiar to the ancients as to us. It is inevitable that, when the human race began to look around for some means of obtaining power other than of one or many pairs of hands, the power of falling or running water should have been utilized to lift weights or drive machinery. The manufacturing spirit has always been fostered where water power was abundant; and, while in cotton and woollen manufacturing it does not furnish at the present time the only power, as it did in the beginning of the last century and the early history of Lowell, it holds its place as a safe, economical and convenient power for driving machinery. There is one great change going on in water power as in everything else,

i. e., the centralization of great amounts of water power in one place, even in one power house, either for use in the neighborhood or a good many miles away. This is in decided contrast to the early days of water power. In the beginning of the last century almost every stream like the Concord river, or smaller, was utilized at each fall of twelve feet, more or less, for running a saw mill, woollen or grist mill. There was a rude timber or stone dam across the stream, a little flume or canal, and the wheel, generally a great under-shot or breast wheel, suspended over the tail race. The diameter of these wheels was usually the same as the height of the falls, and looked something like the paddle wheel of a river steamboat, being extremely picturesque. The shaft which drove the mill was generally of wood, hooped with iron, and of enormous size. The whole apparatus was big and clumsy, and the

power had to be used oftentimes near the bed of the stream, where the mill was likely to be carried away in times of freshet.

It was not common to see mills on high falls, because the flumes and wheels could not be made strong enough to resist the tremendous pressure which would occur where the fall was much over twenty-five feet. The use of water power was limited, therefore, to the smaller streams, lower falls, and wheels of large diameter.

At the present time this is all changed. The new water power plants which have been developed recently at Niagara Falls, Sault Ste. Marie, Ontario, and Massena, New York, will develop within one power house as much as the total horse power of the Merrimack river at Lowell or the Connecticut at Holyoke. This concentration of so much power in one place is possible on account of the comparatively recent development of electricity into which the power from the water can be transformed and carried for a long distance.

There is a considerable loss of power in this way, but it removes the necessity of having the mills either at the seat of the power or at the end of canals which may have to be long and expensive to build.

The three great water powers in

Massachusetts, at Holyoke, Lowell and Lawrence, occupy a place historically between the two conditions already referred to. They were developed at a time when the value of using the power on a great river, with thousands of square miles of watershed, was recognized, but before the idea of carrying the power any great distance was thought of.

This required the building of a system of canals which should carry the water from above the dam to a point where favorable sites for building mills, to use the water power, could be obtained. In the case of Holyoke and Lawrence the whole system was planned for the sake of the water power at the mills; at Lowell, the company owning the water power succeeded an older one which had maintained a canal and locks for the purpose of rafting logs, which followed the location of certain brooks, and was not laid out with the same care, as would have been the case, if it had been designed originally for water power purposes.

It is an interesting question just how the power at Lowell would have been developed if this development had come seventy-five years later; and it is possible that the dam might have been somewhere in the neighborhood of Moody Street Bridge with a canal

about where the present Northern canal is and a power house on the river somewhere above the location of the Lawrence Manufacturing Company.

Considering now the general natural conditions upon which the value of a water power depends we naturally mention the rain and snow-fall as the one source of supply to our rivers.

New England became inevitably a manufacturing centre on account of its natural advantages. The high mountains serving to catch the rain and snow, the deep valleys which retain the snow in the early summer to melt and keep up the flow, the lakes and ponds serving as great storage reservoirs all combined to make the great New England rivers among the most constant in flow in this country. There is a great difference among them; but there are not such tremendous differences between freshets and droughts as we find in the rivers of the west and southwest. In New England the freshet flows are often fifty times the flow in drought; in the west and southwest perhaps two hundred and fifty times.

As the value of a water power depends to a great extent upon its dry weather flow it can be readily seen, that all other things being equal, the stream which varies least

in flow is the most valuable for water power purposes. The most perfect water power would be furnished by a stream coming from an enormous lake or chain of lakes, where the flow could be regulated every day according to the uses to which the power was put. Such a power is rarely found, except in very small ones. There is no power more permanent than the Pesumpscott river, which flows into the ocean about four miles north of Portland, Me. It is only 22 miles long, has a watershed of 700 square miles (about one sixth of the Merrimack above Lowell), of which Sebago lake (50 square miles in area) has two-thirds of the entire watershed. This lake can be drawn down during the summer to a point where melting snow and rain in spring will fill it up again. In the ten years previous to 1896 the greatest flow was 1670 cubic feet per second, the lowest 400, and the average 820. The greatest flow is, therefore, four times the least, as against 60 times in the case of the Merrimack.

We have almost these same favorable conditions of flow in the Winnesaukee river, which forms a part of the Merrimack system. Flowing out of Lake Winnesaukee, with an area of  $71\frac{3}{4}$  square miles, and fed by a watershed of 366 square miles, as the outlet of



the lake and flow can be regulated so that it is almost a constant quantity each day in the year. This flow from the lake we depend upon here at Lowell during the months when the quantity coming in from other sources has fallen off. Taking a large river like the Merrimack, as a whole, it is found that the area of lakes, etc., is but a small portion of the whole, so that there is not the opportunity to store much water as is the case on the watershed of the Winnepesaukee river.

Some brief descriptions of the watershed of the Merrimack river may be helpful in understanding the conditions under which water power is used. The main river is made up of two streams, the Pemigewasset with 1013 square miles of watershed and the Winnepesaukee with 480, which unite at Franklin, N. H., and form the Merrimack.

The former stream has its heart

in the Franconia Mountains, south of the White Mountains and near the beginning of three other large water power streams, the Connecticut, Androscoggin and Saco rivers; the first named supplies the power for the great paper mills at Holyoke; the last two the cotton mills at Lewiston, Brunswick, Biddeford and Saco. The head waters of all these great rivers being so far up among the mountains, where the snow remains so late in the spring, the summer flow holds up long after the smaller streams in Massachusetts have begun to run nearly dry. The watershed of the Pemigewasset, excepting Squam and New Found lakes which have an area of 19.5 square miles, is generally steep and rough. The rain and melted snow run into the stream quickly and raise the river from a brook to a foaming torrent. This branch contributes the one element of unreliability on the Merrimack

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river, which perhaps adds interest to the problem of controlling the power, but is very uncertain in its effect. One can never tell just what a hard rain on the watershed will mean until the Pemigewasset is heard from.

The other branch, the Winnepeaukee has been referred to as being steady in its flow through the year. A freshet is unheard of and one can count, with almost mathematical accuracy, upon just what to expect from this branch.

The Merrimack from Franklin, N. H., down to Lowell flows most of the way through a broad valley, the fall in the stream being mostly at a very few places. At Sewall's Falls, Concord, N. H., Garvin's

Falls, below Concord, Hooksett and Manchester, dams have been built across the main river and power is used for different purposes. The most famous power is at Manchester, N. H., where, with about three-quarters of the watershed at Lowell, the fall is fifty feet, giving a power somewhat in excess of that at Lowell.

Between Manchester and Lowell the only power of importance is at Nashua, where the Nashua river enters the Merrimack with 528 sq. miles of watershed, contributing about one-eighth of the total at Lowell. Between Franklin, N. H., and Lowell the Contoocook, Piscataqua and Souhegan come in from the west, and the Soucook and

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Suncook from the east. All of these streams have considerable water power all the way down from their sources to the Merrimack. The Nashua is the only important stream above Lowell coming in from the south. This stream is particularly valuable because its watershed being so much further south, it keeps up the supply of the Merrimack in the early spring before the water has begun to rise much elsewhere. We have, then, coming into the river above Lowell nearly a dozen large streams, on which power is used, in large or small quantities.

The flow of the Merrimack for eight months is fairly uniform, there

being enough for our ordinary uses in Lowell; for perhaps two months in the spring, after the first warm rains, the melted snow from the mountains fills up the river quickly and raises the river to a height which makes what is popularly called back water. This prevents the mills situated on the river from getting their ordinary power and sometimes cripples them severely. The amount of water is far in excess of what the mills can possibly use and runs to waste day and night.

For about another two months in the late summer and early fall, and occasionally after the hard cold weather in February, the quantity running in the river gets down to

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about one half what the mills can use and then the quantity which each one can draw has to be limited.

The appearance of the river in times of freshet is well known; in the spring of 1895 and 1896 there were two freshets which were equalled only once or twice in the last century. During the fall of 1883 and again in 1900 the quantity which could be furnished the mills was less than the aggregate which they owned. This condition, however, happens very rarely and such extremes may not occur again in a half century. Two things are necessary on account of these extremes of flow. The great heights to which the river rises in times of freshets make it necessary to have all dams and head gates of the most permanent kind, and strong enough to resist the enormous pressures of water; while they must be as tight as possible so that in low seasons of the year the leakage

may not be a serious loss from what power can be obtained.

As has already been mentioned, the flow of the river is pretty uniform for about eight months in the year; and either very high or correspondingly low during the other four. If all the mills on the stream ran either twenty-four hours in the day as the paper mills do, or about eleven, as the cotton mills usually run, it would not be very difficult to know just what quantity of water to depend upon from the mills up river. A good deal can be learned about the different quantities used up the river, from daily records kept by the mills above Lowell which are sent us; and such records are very helpful.

But the fact remains that the effect of the water which is used in Manchester, N. H., in the morning, and constitutes nearly three-quarters of the supply at Lowell, is not felt here until some time

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during the afternoon. The effect of the quantity entering from the Nashua and the other small streams coming in below the Nashua, is felt earlier, but is not over one-eighth of the whole. It may be asked, then, how the water is supplied during the early part of the day?

It was known very early in the history of water power that next to a large watershed contributing to a stream, a large mill pond was an important factor in insuring a permanent flow in the canals. The mill pond above Lowell is about sixteen miles long. The depth of water from the stone dam up to the ordinary height, when the mills are not running, is about four feet. This storage is held back by what are called flashboards, which are held by the pressure of the water against iron pins in the top of the stone dam, and serve as a temporary dam to hold the water back

during the tight and dry seasons of the year. They serve two distinct and important purposes, one to keep the general level of the river above the head gates, up to a certain height, and the other to store some or the whole of the water which would run to waste at night. The amount of storage in the mill pond serves to keep the canals up until the water gets along from up the river. The mills at Lawrence, eight miles below us, have to depend in the same way upon their pond to keep them going until the water gets along from Lowell. The flashboards and water stored behind them serve as the regulators of the flow and make it possible to draw in ten and one-half hours, in most seasons of the year, what came during the twenty-four hours. It is proposed to still further increase this storage of water by means of additional flashboards.

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The flashboards, like everything else, have their weak points. From the definition of flashboards, they are not supposed to be permanent, and during high water, particularly when the ice is running, we expect these boards to be bent over or carried away. This sometimes has a serious effect upon the head in the canals, because it is not possible to foresee the time of their breaking down or repair them until the water has gone down. While generally a rise in the river is followed by plenty of water and a good head in the canals, this may be overdone, and we are in the condition of the good deacon who prayed for rain and got a cloudburst which drowned out everything in sight. We do not believe

in too heroic measures in water power matters, but we cannot always have just the proper quantity of rain.

During the winter months it is extremely difficult to keep the canals free from ice and snow. The amount of trouble varies a good deal with the season. If the cold weather comes on with the river high [and open, the running water forms what is called anchor ice. This is drawn into the canals by the draught from the mills, and has to be taken care of through the waste dams. It is heavy, sometimes nearly submerged, and if drawn onto the racks, nearly impossible to get off. Snow and ice together are also very troublesome with the river open, and need con-

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stant attention. Generally, however, the river freezes over with the first cold weather, increasing in thickness until it is so strong that it does not break up when the gates are opened in the morning.

There remains then what freezes in the canals over night and which breaks up, most of it, as soon as the mills start in the morning. Men are stationed at all the waste dams, to break up the ice as it comes in sheets towards the dam. The ice varies in thickness from a half-inch to sometimes 2 1-2 inches, when the freeze has been from Saturday noon until Monday morning, in very cold weather. When it is considered that almost every morning in winter we have ice from an area of canals twice as large as the North Common to get rid of, it may suggest itself to you that an occasional falling off

of the speed cannot be laid up against the company having the water power in charge.

The Pawtucket canal, which is the oldest one in the system, originally supplied all the water to what is known as the Upper Level, the Merrimack Mills drawing their water from the Swamp Locks, near the Lowell Machine Shop, through the canal which passes under the Merrimack street station, and the Tremont & Suffolk theirs through the Western canal. Between 1834 and 1846, a period of drought, when the rainfall for the entire period was as low as our lowest years since, it was extremely difficult for the mills to draw their lawful amounts. This condition led up to the building of the great Northern canal and the Moody street feeder in 1846.

The former carries about two-thirds of all the water used for

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power in this city. The surplus from the Northern canal after the Tremont & Suffolk have drawn theirs, goes through the Western canal to supplement the Pawtucket canal at the Swamp Locks. The Moody street feeder, composed of three underground channels from the Western canal, under Moody street, feeds into the Merrimack canal just below Merrimack street, often furnishing a surplus beyond the needs of the Merrimack Manufacturing Company, which goes to the Lowell Company.

The Pawtucket canals, upper and lower, the Northern, Western and Merrimack canals together form a system about 5 miles long, the widths varying from 30 to 100 feet. With the recent improvements, they are now in shape to supply the aggregate amounts used by the mills for many years to come.

There are other periodic difficulties which sometimes make trouble

for a while, among which I might mention the leaves running in the fall, which plaster the racks and cut off the supply, and the many troubles and annoyances which come with the low water of the early fall. But in a general way even with these difficulties which have been touched upon, the freshets, droughts, ice and snow, the fact remains that the mills in Lowell are supplied for most of the year with a large quantity of water maintained at a good head and delivered at their mill sites.

Of the total of 33,000 horse power used by the mills at Lowell for motive power purposes, probably 15,000 horse power or nearly one-half is furnished most of the year by the water power, while for a part of the time it is considerably more.

The mills at Lowell draw from the nearest canal a certain number of mill powers, the name coming

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from the power required to drive a complete mill built at Waltham, about 1824, containing "3584 spindles, spinning No. 14 yarn, with all the apparatus necessary to convert cotton into cloth." This last has been quoted from an interesting paper by Nathan Appleton, who was one of the pioneers in cotton manufacturing, on the introduction of the power loom. A mill power was found to be something over 60 horse power. At the point

where water is taken the responsibility of each mill begins and continues until the water drawn is discharged back into another canal or the river. The choice of the kind of water wheel used, and the method of transmitting the power rest with the mill corporation, no other rules excepting the manner of measuring the water and preventing leakage being laid

*Continued on page 20.*

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## EDITORIAL.

"Gilt-Edge" overseers. I have to my sorrow seen one of these "gilt-edge" men; yea, more, I have been at some period of my life in daily intercourse with him, and he has so disturbed me that I have taken him to my home at night and had a less cheerful face for my family than I ought. I have even

had him as a sort of nightmare in my dreams. I have had so much trouble with this "gilt-edge" man, that I am not fully able to shake his presence off, though it has been years since I have much to do with him. At times he comes to me with the same consequential air, the same self-conceit, which used to be so gratifying to him, and so very trying to the best Christian spirit I could command. I think of him as one to whom defeat was as nothing. Hit him ever so hard with practical fads which sent his theories to the winds, and like a pressed rubber ball he would soon be full of air again, inflated in a way which used to make me think of the story of the man who expressed the regret that he could not have been present at the creation of the world so as to have offered some valuable suggestions.

Have you not seen or heard of carders who knew more about spinning than the boss spinner, and vice versa, also boss weavers who knew more about the structure of

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fabrics than the designer, the draftsman, who could make a drawing (not a design) for a fabric and place upon it interlacings that were not practical and run around the mill singing his praises, that he knew more about weaving than the superintendent? Beware of these "gilt-edge" know-everything men. They are to be found in all walks of life—mill, home, workshop and school. I like to see a man understand his business, when he is thoroughly competent he will let others take care of themselves. It does me good to see the way some men will take hold of a piece of cloth to pick out the weave, as if they were

confident they could do it in a satisfactory manner. A competent weaver will take hold of the lay of the loom in a way which is convincing that he knows something about weaving and is master of the mechanism of the machine. A man who has ability and is attending to his own work is a far superior man to the "gilt-edge" one who is constantly neglecting his own department to interfere and give advice about the running of other rooms than his own. In such a case look around you, study each department, it will be easy to see who has the most orderly room and competent help.

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How I have desired to know as much about my own department as the "gilt-edge" man thought he knew, for then perfection in one branch of the institution would be close at hand. Workshops, mills and schools should have overseers and instructors, honest, truthful and upright men, men who will work harmoniously together, each doing his part to hand the work over to the next room in the best possible condition, all working to bring about the best possible result for the employer and student. The man who has worked long in a mill and has not found the "gilt-edge" man to contend with, has my hearty congratulations. Let us all be brothers in a larger sense than that we descended from Adam. If there has been any mistakes in one room, which can be remedied in some other, it should be done with the utmost cheerfulness, and also from a sense of duty. It may be the

"gilt-edge" man is given us for the "trial of our faith." I am sure he tries our patience, and while we forgive him let us hope he will go "his way and sin no more."

...

Pulled wools are largely used in the manufacture of flannels, and one reason of their being so used is because the process of pulling, either by burning or sweating, destroys the felting properties of the fibre, and so better fits it for use in flannels, which will not so readily shrink in washing.

Ellis—"Did you play a diamond?"

Hawthorne—No, I played a heart and lost a diamond."

Harriman has joined the Hospital Corps. Woonsocket air could not have been healthy.

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*Continued from page 14.*

down by the company managing the water power.

For this reason perhaps there is a great variety in the water wheel plants of the different mills as with all the other machinery. The different kinds may be an interesting question to take up briefly. It is possible with material at hand, to trace clearly the development during the last seventy-five years, in the manner of building water wheels, the improvements made and greater efficiency resulting from these improvements.

Most of the water used previous to 1850 was with breast wheels, so-called. In principle they were more like the paddle wheels of our river steamboats than anything else, with one addition. There was a breasting or apron from about half way on the circumference of the wheel, where the water was let

into the buckets, down to a point well below the bottom of the wheel where the water discharged. This almost touched the circumference of the wheel as it revolved, and served to keep the water from spilling out of the buckets. Some of these breast wheels, principally in England, were made of iron and as large as 30 feet in diameter. Their efficiency was comparatively high (60 per cent. when well built), but they were not economical when the water was so low that it would not fill the buckets.

It is very easy to see the location of these old breast wheels in many of the present wheel pits. The wheels were sometimes 16 feet long and from 12 to 17 feet in diameter, the ends of the shafts resting on heavy stone piers which would be perhaps the only supports. Most of them had a rack or spur gear around the circum-

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EGYPTIAN COTTON, Etc.

ference of the wheel at one end which drove into a pinion on the main shaft.

The best examples of breast wheels in Lowell could be seen as late as 1896 at the Concord River Mill of the Middlesex Company. There were three wheels aggregating 48 ft. long and 12 ft. in diameter. The arrangements of gate, etc., for admitting the water to the wheel and transmitting the power were about the same as the Lowell Machine Shop wheel referred to. They were all clumsy and required a great deal of room both in area and in height for the power they gave, but served their purpose well until the time came to put in a modern wheel plant. Six 30 in. turbine wheels took the place of three 16 ft. breast wheels and give probably 50 per cent. more power.

There were one or two examples

of the tub or scroll wheel here in Lowell, but as they are in a measure transitions from the old breast wheels to the Boyden wheel and did not come into general use in Lowell, they need not be described here.

The first Boyden wheel, named from its inventor, Uriah Boyden, was designed and built for the picking department of the Appleton Company in 1844, and its increased efficiency soon made this type universally used. The greatest difference between the Boyden wheels and the old breast wheels, is that in the Boyden wheel the water is admitted through guides to all parts of the wheel at once instead of simply at one point in the circumference. The discharge is from the guides which are inside of the buckets, out through the wheel into tail water.

**STUDY**

the points of our different machines and compare with others.

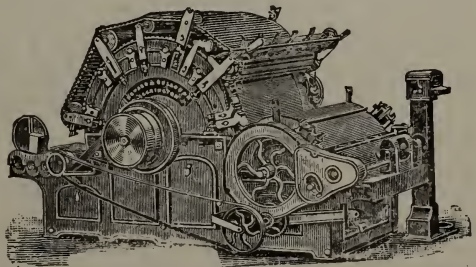
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the merits and you will be convinced beyond a doubt of their superiority.

HOWARD & BULLOUGH

**American Machine Co., Ltd., Pawtucket, R. I.**

Boston Office. 281 Congress Street.



STEAM BOILERS, AND ALL KINDS OF *STEEL AND IRON PLATE WORK.*  
**SCANNELL & WHOLEY,**  
 TANNER STREET, . . . . . LOWELL, MASS.

A whole evening might be devoted to the description of this wheel; it may be said that at full gate this wheel gives an efficiency nearly as high as the most modern turbines, and its wearing qualities have been remarkable. There are some today in Lowell, parts of which are 50 years old.

A 42 in. Swain wheel built and tested in 1869 and again in 1870 gave a somewhat better efficiency at full gate than the Boyden wheel had given and at part gate showed a decided gain. This wheel, differed from the Boyden wheel in having an inward discharge from the guides into the wheel, the water leaving the wheel near the shaft. The gate of this wheel, unlike any others, opens downward, admitting the water at part gate always near the top of the wheel. The model alluded to is of an old fashioned pattern and hardly like the wheels

at present built by this company. The improvements in the Swain wheel and others of a somewhat smaller kind bring us down to the present time. There are in Lowell today 80 large wheels, of which 27 are Boyden wheels and the other wheels of a more modern type. Most of these are on vertical shafts on single wheel pits, the power being transmitted through crown and bevel gears on to a main or jack shaft.

A recent demand for high speed wheels to drive dynamos for the purpose of developing electricity, or to grind pulp in the great pulp mills has led to the installing of wheels singly or in pairs on a horizontal shaft. The wheels are placed in a steel case or flume at a level well below the canal, but above the height of the lower canal or river, the discharges from the wheels being through tubes called

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draught tubes. The wheels drive a pulley or pulleys on the same shaft from which power is belted off. In a great many ways this method of placing the wheels is a decided gain.

The wheels and case are above the water which brings them out of wet and grimy wheel pits, where they can be kept in good repair,

probably have a longer life than they otherwise would. There are no noisy gears to break, which reduces the noise and cost of transmission. With proper designing they can be as efficient as the vertical wheels, and from their convenience will probably replace the older vertical wheels as they wear out.

#### HISTORIC STUDIES IN HOME FURNISHING.

### THE ART OF EMBROIDERY AND LACE MAKING.

By MARGARET AINSLEE.

By permission of the Philadelphia Inquirer. Copyright by Seymour Eaton.

*Continued.*

Thus, from a stiff, wiry-looking trimming, lace, passing from stage

to stage, became more dainty and filmy in appearance, geometrically planned patterns giving way to

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Of Every Description.

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(Successors to Jeremiah Clark)

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Lowell, Mass.

flower and scroll designs, which in turn were superseded by graceful, fantastic effects, bordering upon realistic representation. Machine-made lace was brought to an advanced stage of perfection during the latter part of the eighteenth century, menacing pillow-made lace more than needlepoint, which gained the public favor and reached its artistic climax in the early seventeenth century, 100 years before the bobbin lace enjoyed the same degree of favor. Belgium, through its trade with England, has infused this method with certain technical characteristics never yet surpassed.

While it would be quite impossible to study the many kinds of lace now on the market, there are certain well-known hand-made laces which will always be in demand and which every intelligent woman should therefore recognize at sight.

When Louis XIV introduced the art of Venetian needlepoint

into the various insignificant lace centres of France the most brilliant results came from the Alencon royal centre, whose lace-makers showed exceptional talent in adapting themselves to the subtle developments introduced by the king's artists. That Alencon still holds herself worthy of her illustrious past may be inferred by comparing the illustrations of the point d'Alencon of the eighteenth and nineteenth centuries.

The beautiful Venetian laces copied by the French schools are classed under the general head of guipures de Venise. Originally the term guipure implied a filigree work stiffened with a gimp or wire, bent into designs and joined by fancy stitches; gradually the term was extended to all laces made with bars which distinguished them from those having small meshes classified as "dentelles." The finished crispness and firmness of outline of the

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Woolen Manufacturers,

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Venetian guipures were attained by casting minute stitches over horsehair. It is said that once when the lace-makers of Venice were striving to make for Louis XIV a collar (valued at \$300) which would surpass in marvelous delicacy all previous specimens of their handiwork, they were not satisfied with the fineness of the ordinary horsehair and used instead their own hair. The classic home of the modern guipure is in Auvergne. Here more than 130,000 women live in great simplicity, and by their versatility in using threads of flax, silk, wool, Angora rabbit and goat's hair, have made their mountain retreat one of the most important local lace-makings in the world. During the greater part of the last century they have been making rich black guipure of heavy silk thread.

Probably the French lace most widely known because of its beautiful imitation, is that of Valenciennes, made in the French town of that name since the fifteenth century. It did not, however, acquire a distinctive appellation until the eighteenth century and has not been made in Valenciennes since the revolution. The style of lace always identified with this name is now made in a small frontier town of France, where a museum of laces has been established. Valenciennes lace is also made in two provinces in Belgium, where convent girls, spinsters and widows form themselves into lace-making communities. This lace is one of the oldest pillow-made laces, and is distinguished by a softness and flatness formed by very regularly plaited meshes of the same kind of thread used in the floral design. It is differentiated from Mechlin, a pillow-made lace very popular in England, because of a similar light-



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And I give careful, painstaking attention to it. I give special attention to the repairing of fine watches—the kind of Watches that need extra careful adjustment. I try to have my work give such satisfaction as will win the confidence of all who leave their Watch repairing in my hands. I want you to feel that when you leave your Watch with me for repairs the work will be done to the best of my ability and in a competent manner. It is my ambition to add to the reputation I think I have in a small measure already established, of doing honest, thorough Watch repairing.

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## "COST FINDING IN COTTON MILLS."

The only book published on "Cost Finding." Cloth binding price \$1.50.

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**M. G. WIGHT & COMPANY,** MILL SUPPLIES,  
RULING and BINDING.  
67 MIDDLE STREET. Tel. Connection. LOWELL, MASS.

ness and pleasing effect, by the lack of cordonnets or outlining threads. The absence of any thread-work in the nature of relief renders Valenciennes lace particularly flexible and suitable for laundering. For these reasons it was particularly prized for the lingerie of the great ladies of the eighteenth century.

Another lace very popular in France, Brussels point, or point d'Angleterre, was made in Flanders and sold in England. The English so greatly appreciated the Flemish laces that for a time they monopolized the wearing of them and expended such immense sums upon foreign point that Parliament was obliged to pass sumptuary laws protecting the manufacture of English bone lace and prohibiting the importation of foreign laces. The court of Charles II immediately proceeded to evade this edict by smuggling in the richest laces in the Belgian market under the name of English point, an appellation coined for the purpose. The Flem-

ish lace-workers invited to settle in England were not able to produce a fine quality of lace because they could not secure the necessary flax, so the point was thereafter made in Brussels under the English name. The invention of machines for making fine nets gave in 1830 a new impulse to the application of floral ornament upon tulle. In this way shawls and bridal veils of great beauty would be made at a comparatively lower price. Charming variations of the Brussels pillow-made applications are obtained by a combination with needlepoint. Equally popular among the modern Belgian laces is the Duchesse guipure.

An English pillow-made lace similar to Brussels in fabrication, is the Honiton. Great care is given to the flower sprigs or separate ornaments, which are worked separately and originally joined together by small bars which have developed into a kind of guipure effect.

*To be continued.*

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LOWELL, MASS.

**STUDENT LIFE.****PART I.—LIFE IN SCHOOL**

The Lowell Textile School, situated in Lowell, Mass., was proposed early in 1891, but was not formally opened until Jan. 30, 1897. The intervening time was spent in careful investigation of the textile schools of the old world, and with the results of this investigation as a basis, the Lowell Textile School started its successful career. The purpose of the school is "for thorough instruction in the theory and practical art of manufacturing all fibres known to the textile industry." Many improvements have been made from time to time, and the attendance has increased at such a rapid rate that the present quarters are inadequate, and plans have been prepared for a new structure, which when finished will be a model textile school.

The studies are divided into five courses: Cotton Spinning, Woolen

and Worsted Spinning, Designing, Chemistry and Dyeing, and Weaving. Art is an optional course.

The Cotton Spinning course is in charge of Mr. Humphrey, Mr. Clark assistant instructor. The temperature of the room necessarily being warm and moist, causes the class to become drowsy during the lectures. Whenever this occurs the genial professor tells one of his inimitable stories or relates one of his experiences in the South, which arouses the class, and work is resumed with new vigor. Occasionally, one of the class wishing to hear one of these stories, feigns drowsiness, and generally the ruse is effective.

A quick method of subduing an unruly member of a cotton class is to subject him to the first "degree." This consists of conducting him to the cotton bin, and

after advising him on the evil of his ways, he is unceremoniously lifted in the air and deposited in the middle of the mass of cotton. His instructors watch him closely, and he usually finds himself in a short time on a downward career. By the time he emerges he usually becomes submissive and profits by his experience. Should the "first degree" fail to conquer him, he takes the "second, or ice water" degree. This degree has always caused the most turbulent spirits to become subdued.

The Woolen and Worsted Spinning department is conducted by Prof. Barker, Mr. Stewart as assistant. Lectures are given on the various machines and their operation, followed by practical work on the machines. Students are anxious to commence the practical work, but after a time they find out that it is not always easy. Stripping the cards is the initiation to real work, and this soon tames down the freshman, especially if another class has "run the lot through."

The mule (not the four-legged animal, but the machine on which yarn is spun) is the most complicated machine in the woolen course, and this statement can be verified by all who have had to write a thesis upon it. Learning the art of "piecing ends" affords many oppor-

tunities for awkwardness on the part of the beginners, and affords enjoyment for the seniors.

When the instruction of worsted is taken up, the "woolen boys" become "woolen men," and each student works hard to uphold the standard.

The Design department is managed by Prof. Umpleby, Mr. Barr assisting, and to many this is the hardest course in the school. The manner in which a design is represented on paper is soon learned by the student, and his first attempt at picking out a piece of cloth and producing it on paper is not soon forgotten, and there is a general comparison of results to make sure that he has not indicated any "risers" which should be "sinkers." As soon as the work is understood so that it is possible to give a greater amount, it comes in the form of color effects, original designs and pickouts.

In this department it is a noticeable fact that all work hard and lose no time in school hours, thereby lessening the home work.

Hand looms are included in this department, and are in charge of Mr. Pradel. Here the student does his first weaving and becomes acquainted with the manner in which a design is woven. Many at the beginning like to "cut," but before the year is over they realize

the importance of hand looms and endeavor to make up lost time.

Chemistry is taught by Professor Olney, s. b., ably assisted by Messrs. Spencer and French. Here the troubles of the student are many. The freshmen in their first few experiments vainly endeavor to outdo each other in breaking beakers, and when the usual five-weeks examinations come, then their "cup of bitterness is full." Many take those examinations, but those that pass are few and far between.

The freshmen's troubles are light compared to the trials of the sophomores. Lectures in dyeing are given twice a week, and those that are acquainted with shorthand are lucky, and many are the blessings bestowed on this department for the many hours at night devoted to copying chemistry lectures.

Weaving is in charge of Prof. Wm. Nelson, Mr. Thos. Nelson assisting. Here the freshmen gaze at the swiftly moving looms and wish that they were at least "sophs," so that they might have the pleasure of "running a loom." When they do become sophomores they soon find out that all is not enjoyment here. Work, and plenty of it, takes some of the fascination away from them, but they finish their term with the knowledge that (if they have given their time in a right manner) what they do not

know about a loom and its parts is not worth knowing.

Although the number of students at the school is not large, there are enough to make matters pleasant, and they often keep the professors busy. The "boys" represent all parts of our own land, England, Canada and Japan. The majority of the "Southerners" take up the study of cotton and their southern cheerfulness and expressions give pleasure to all.

The running and care of machines is included in the various branches of study, and accustoms the students to lay aside collars and cuffs to don overalls and jumpers.

*To be Continued.*

TWO HEADS ARE BETTER THAN ONE.

### *BLANKETS IN SOUTH AFRICA.*

Vice-Consul General Hanauer, of Frankfort, writes — That the Belgian Consul in Pretoria, Transvaal, reports that blankets made of shoddy find large sales among the Kaffirs in South Africa. These blankets, called "Koogs," are made at Dewsbury, England, and are from 64x68 to 72x84 ins. in size, weighing 4½ and 5 lbs. respectively. They come in three different qualities and have broad red, yellow, and blue stripes on both sides. The importation of these blankets during 1899 amounted to \$370,000.



*CRACK 'EM, THEY'RE TOUGH.*

---

Prof. L. O. l. y.:

Gentlemen—This compound has the formula  $C_{40}, H_{69}, O_{16}, N_{12}, Si_{10}, Cl_9, COO, Na, C_2, H_5, H S O_3$ , and is commonly known in the trade as Alpha-beta-omega-di-amido-benzol tolum solphmic-hydro chlorous-sulpheric “swiftic” acid, and the formula of which occupies two board-and-a-half and can be applied for burns, scalds and also is used for removing boiler scale and all other eruptions.

We understand that Fergy was feeling “rocky” Thursday. What’s the matter, Fergy?

Professor B-h-r. No, I do not use the “dirty weed.”

Signed, RAMSDALE & GANT.

We are all glad to see “Little Ricks” back again after his long and severe illness.

Y-ngm-n. “I like a blue waist.”

Miss Blue Waist. “I like dimples.”

The students should object to paying full price for poor design paper.

Str-t-n and G-nt take no interest in ice boating. So do certain members of the Art Class.

C-rr-n has applied for luncheon tickets in the studio.

“Abe” Lincoln visited us for a day. He will return for study next term.

The famous “Order of Buffaloes” has roamed into the school.

No meeting has been held in regard to the second year class pin. Why?

#### PERSONALLY CONDUCTED TOURS.

Ew-r conducted four young ladies through the school recently and showed his loyalty to his department by wearing on the back of his jumper the imprint of a hand in chrome pigment.

M-rh-se and C-rr-n’s tour was successful until the quartette endeavored to leave the balance room. The young ladies considered the way in which the doors were fastened, a joke, but “Willie” thought differently.

G-nt and W-dm-n’s tour, with two of Joe’s proteges, was not enjoyed by Joe, and he vainly endeavored to shoulder his burden on “Nudget.”

“Prof.” Bennett and G-nt had the pleasure of showing the school to four of the fair sex recently.

SAMUEL H. THOMPSON, President.

ELISHA J. NEALE, Treasurer.

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IMPORTERS, MANUFACTURERS AND DEALERS IN

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### A PAN-AMERICAN EXPOSITION BUILDING.

#### OHIO STATE BUILDING.

Ohio, displaying commendable and practical enterprise, will have a very appropriate and beautiful building at the Pan-American Exposition next summer. The site which has been chosen will give the building a prominent position, as the ground is twelve feet higher than the water level of the mirror lakes. It will stand on the broad plateau near the Triumphal Bridge at the intersection of the two principal thoroughfares and at the head of the dock landing of the state and foreign building allotment. The design is plain Grecian Doric,



the beauty of which will lie mainly in its classic proportions and commanding position. Strength and simplicity—two laudable state characteristics—are thus embodied in this concrete emblem, which will stand throughout the Exposition a monument to the importance of the Buckeye state. A colonnade

*Lothrop & Cunningham*  
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A review of our past year's work shows a most pleasing increase in our business, both in quality and quantity. All our old customers have found us in our New Studio and many new ones have joined them in hearty appreciation of our efforts to give them the very best in photography.

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BICYCLE REPAIRING AND SUNDRIES.

**GEORGE H. BACHELDER,**

110 Middlesex Street,

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will completely surround the inner house, which is designed exclusively for social purposes. Ohio people will make this their rendezvous when visiting the Exposition.

The plans for the building as designed by John Eisenmann of Cleveland, have been approved by Governor Nash and State Auditor Guilbert. The size of the building will be 84 by 122 feet. A ten foot terrace walk will extend around the outside, being widened at the northwest corner to a circular form, thus providing an ample approach from the dock landing. The first floor will contain an assembly room, 30 by 53 feet, with a ceiling 24 feet high. This floor will also have a commissioners' reception room, ladies' reception room and private offices, with a parcel room and post office. The second floor will contain a sitting room 23 feet square, with extra rooms for attendants and

four guest chambers for the accommodation of state visitors.

The lower floor is intended for the use of the general public and the upper floor for the commissioners, state officials and the state guests. Natural gas will be used for heating and electricity for illuminating purposes. The artistic manner of lighting will constitute part of the interior decorations. On each face of the four corner pilasters of the porch, the state monogram will be interwoven with a wreath of buckeye leaves and fruit, the design containing a lighted torch. As the approach from the dock landing will be the most picturesque, the building will be embellished at the northwest corner with a statuary group. The background worked in relief upon the pilaster shows the great seal of the state with its hills, trees, sunrise and sheaves of wheat and arrows.

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A full line of Tailor Made Suits, Jackets, Skirts, Silk and Shirt Waists, Reefers, Hosiery, Boys' Suits and Knee Pants.

## DRY GOODS AND MILLINERY

All of the best and newest designs at lowest possible prices. Our headquarters are in New York, and our Branch here has the opportunity to give you best bargains for your money. We are positively the cheapest in town. Give us a call and you'll be satisfied to remain our customer.

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**CENTRAL AND MIDDLE ST., LOWELL, MASS.**

No Bluff or Bluster, But  
**FINE HAIR CUTTING and EASY SHAVING**

Good honest work.

Separate Parlors for Ladies.

**HAIR SHAMPOO, 25c**

WEDDING, PHOTO AND PARTY HAIR DRESSING.

**CURTIN'S, - . - 36 Central Street.**

In the foreground is the centre figure standing on the prow of a boat to typify the state. The Ohio river is represented by a Mermaid and Lake Erie by a Triton.

The state of Ohio will be represented at the Pan-American Exposition by a very able commission consisting of three members. Chas. L. Swain, LL. B. of Cincinnati, has been chosen chairman. The other two members are the Hon. W. S. McKennon of Ashtabula and the Hon. Samuel L. Patterson of Waverly. Commissioner Swain is a lawyer of prominence who has been twice elected to the General Assembly where he was leader of the democratic side of the house. Commissioner McKennon is a manufacturer, being proprietor of the McKennon Iron Works at Ashtabula. He has occupied prominent offices both locally and in the State Legislature. Last season he was chairman of the finance committee. Commissioner Patterson

represents the Seventh District, comprising the counties of Adams, Pike, Scioto and Jackson in the Ohio senate. He has been mayor of Piketon, his native town, for ten consecutive years.

The exhibit proper will be one of extraordinary interest. Abundant natural resources have rendered the task a pleasure to the commissioners, who are thoroughly alive to the importance of a proper representation at an Exposition of such magnitude. Ohio is one of Uncle Sam's most valuable farms. With a generous frontage on Lake Erie, bounded on the south by the Ohio river and blessed by a generous rainfall, it has no lack of water. Gently undulating in contour, it has ample drainage without much waste land, which fact is illustrated by the 10,000,000 acres under cultivation. Where the surface is broken it is but a door in the immense coal deposits which furnished last year 16,695,949 tons.

**W. I. Hervey, D. D. S.,**

**DENTAL ROOMS,**

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**WARE BROS., Tailors,**

Are noted for style, fit,  
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SPRING GOODS NOW ALL IN.

**106 Merrimack St., Lowell, Mass.**



Corner  
Central  
and  
Merrimack  
Streets.

BEST PHOTOS.

## A. J. LESTER'S Third Annual Reception and Ball,

ASSOCIATE HALL,

Wednesday Evening, May 1, 1901.

TICKETS, - - - - 50 CENTS.

This amount would have been increased but for lack of cars to haul it to the market. The state has upwards of 9,000 miles of railway. The roads were very busy carrying 1,215,000 barrels of salt, 2,378,212 tons of pig iron besides the products of the farm. The direct products of the soil and mines are augmented by greatly diversified products of the mechanic arts. Steel ingots to the amount of 1,489,065 long tons, 2,000,000 kegs of nails and other products of the mills and factories amounting to millions of tons. With a population of four and a half millions, the state employs 25,256 teachers in the public schools who instruct 810,285 pupils or more than one-fifth of the entire population of the state. Add to this the 41 universities and colleges with 11,239 students and the superior intelligence of the inhabitants of Ohio is, in a measure, accounted for.

*CRACK 'EM, THEY'RE TOUGH.*

Mrs. Grundy said, "Somebody" went to Boston to get "spliced," and "Somebody" didn't deny it. I wonder why? He cracked a

bottle on the strength of it, that night, and that caused dismay to his bosom friends by convincing them that it was really so. Possibly it isn't so but only a feeler, leading in that direction. It's up to him to produce the lady or to get one, which? How about that, Benedict?

How long since C-r-r has had family burdens? Ask C-rr-n.

Alas, poor Fergy! A benedict now. Some punishment ought to be devised for one who so cruelly deceives his friends.

G-t, from his juicy tendencies, has been aptly termed "The Watering-pot" and "Automatic Sprinkler." The result of his labors are about him wherever he may sit.

Prof. Humphrey.—Well boys, TootToot W-o-o-o-h, time to blow the whistle.

We understand that Minge was initiated into the Buffaloes last week. Congratulations, Jack.

Multiplication is vexation,

Division is as bad;

The rule of three purplexes me

And proportion drives me mad.

O-l-y.

# Lowell Textile Journal

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## COST FINDING.

LECTURE BEFORE TEXTILE ASSOCIATION.

---

E. W. Thomas, agent of the Tremont and Suffolk corporation and one of the most successful mill men in the country, addressed a large audience, composed of overseers, second hands and operatives, at the Textile School hall, March 6, 1901.

The subject of "Cost Finding" is one of an exceedingly important nature. Its importance to the manufacturer cannot be over-estimated, and in these days of such close competition in the textile trade, it is not only necessary, but absolutely essential that the manufacturer be able to clearly and accurately establish the exact cost of the goods he places in the market.

The mills making but one kind or grade of goods, say a print cloth mill, or one on standard drills, can determine their cost of goods very easily, as compared with our large plants that are making a large variety of goods, with different organizations and a wide range or

numbers of yarns. The same is true of a yarn mill making a large variety of numbers.

It must be evident to you, that the only proper way to consider costs for such large plants, is to take each kind of cloth and treat it throughout as though it were the only kind made at the mill, in so far as labor is concerned.

Much more and closer attention is being paid to the methods of computing costs than ever before, for various reasons, not only among ourselves, but by our Southern friends.

When years ago, our mills, making but one or two varieties of goods, were forced to, or voluntarily did, increase the kinds of goods they made, then it was, that they found the old methods of obtaining costs were not satisfactory, resulting in the establishing of new methods.

Men who are known to be close and careful calculators of the cost



of their goods do not fear each other in trade, as much as they do the man who "thinks or guesses" at the cost of his goods, for the latter oftentimes by quoting too low a price establishes a price that must be met by other parties, who perhaps know positively that the price thus established is lower than actual cost.

The plan of cost finding I desire to present to you has this advantage in so far as mill labor cost is concerned, of being founded on actual facts, as existing, and nothing is assumed, so that this portion of the work can be absolutely worked out.

To start with, all overseers or department men should be required to work out a monthly cost sheet from their weekly pay roll. I say "should be required" advisedly, believing and knowing from my own personal experience, that such requirement from an overseer makes him more proficient in and gives him better knowledge of the smaller details of his department.

Now to start with, the pay roll of any room ought to be sub-divided into sections, for example, in a card room the names of the grinders ought to be together, so that the total amount paid for grinding may be seen at a glance. Then put all strippers' names together, and each class of operations by themselves.

Each number of roving should have the operatives' names who worked in separate sections. Other departments should be controlled accordingly.

The general help of the room including the overseer, second-hand, fixers, oiler, scrub, roving men, elevator hand and any others whose duties are not confined strictly to any one class of machines.

In the pay rolls of the mule spinning rooms, spinners' names ought to be together, with the amount of yarn spun or hanks produced by each. Doffers' names under another, and general room help under another. Following this system in all pay rolls.

Now the advantage of this is shown by the collecting of the various amounts of each week's pay roll into the monthly account sheet. This matter I will deal with later.

Naturally, an overseer is somewhat averse to paying any attention to this matter of figuring out his costs, and considers it of little value. Well, let us see.

Take two mills on the same class of goods, and similarly fitted up with their machinery. The manager of one requires this system to be carried out by his overseers, and from the reports handed him each month he is enabled to know just what each number of roping, each number of yarn, each kind of cloth,

costs. He can make comparisons, one month with another, one six months with another six months, he can keep in close touch with the production and cost of same, he can by this system follow back and locate in the room and in the operation, where any increase or decrease in the cost exists. His overseer can tell him just what each number of roping, each number of yarn costs. And in the card room, they will be able to tell just what carding costs per pound, what the operation of drawing costs, what each number of roping costs per pound. They are on the alert to find out whether they are producing cheaper per pound than some other overseer in a like department.

Now, in the other mill, wherein the responsibility of making up costs is taken from the overseer. I mean now his own individual labor costs, and the same are made up by some one else, from the ordinary pay roll, and the ordinary report of the production, and it seems to me almost impossible for correct costs to be obtained, and it also seems to deprive the overseers of a certain amount of information they should possess, which from lack of interest is to them an unknown factor.

Comparing the overseers of these two mills, would you not say, without hesitancy, that if you were man-

ager of a mill, that all other things being equal, you would select an overseer who did know about the cost of production.

Now the application of all this is "up to you" as the boys say. It seems to me that it is one of the most important questions you can take up for consideration, comparison and discussion in the Textile Association. The man, be he manager, superintendent, overseer or second-hand, who thinks he can keep all the secrets of manufacturing and costs locked up in his desk, or written in a book conveniently tucked down his coat pocket, only to be looked at in the privacy of his office or in the quiet of his home, is generally the man who knows everything, whose ways and methods are the only ones, who shuts out of his experience, the opportunity of learning more than all his combined experience. He is the man who does not grow, who wants to dictate or personally make all changes in his room, for fear his second-hand or possibly fixer, may find out something. Happily now for all concerned, this type of man is rapidly disappearing. In every official and employer holding position, more is required of practical knowledge than ever before.

It seems to me that, speaking as I do to practical men, that the matter of industrial education

should be one of your foundation stones. By this I mean that if you are in a cotton mill you should employ every means to thoroughly post yourselves in all that pertains to cotton in all its phases, to the construction and operation of all machinery connected therewith.

Agent Thomas then entered into a detailed statement of mill expenses, including the cost of: First, labor; second, several expenses which consist of all labor not included in mill labor account, all monies paid out, of every nature in carrying on the business; third, cost of raw material; fourth, treasurer's expenses; fifth, commissions to selling agents. In conclusion, agent Thomas said:

Your value to your employer is measured by your ability and capacity, you are employed in one of the great spheres of industry which is very peculiar in itself. Did you ever stop to consider how little we know about cotton, its make-up, how it grows, why some cottons are so much harder to work than others in keeping your numbers. The field for instruction and of obtaining knowedge in this art is wide and has not been explored to any extent. We have seen other industries grow, improve, and change their processes of manufacture, but we as workers in the cotton mill have seen but little actual improve-

ment in comparison with the magnitude of industry.

Mechanical improvements have been made and it is certainly true much better machinery has been introduced, but with the exception of the magazine loom, no radical reductions in cost of manufacture have been made, proportionate to the growth of the industry.

The introduction of steam power into the manufacturing world drove the little blacksmith shop, the shoe shop, hand spinning, and the weaver's loom, from the isolated village to the busy industrial centre, and open up new problems. In this, long ago, the small workman found it paid to consider the physical, mental and moral welfare of his apprentice or assistant. If it paid the small employer, and said employer was benefited by advice and instruction, so much the more should the employer of large numbers of people, urge them to take every means of improving themselves in all that tends to assist them. And in doing this mutually all are benefited.

Michael Angelo, on pointing out several alterations of detail in a statue was met by the explanation, that the changes he suggested were but trifles.--"Ah," he replied, "trifles make perfection, and perfection is no trifle."

The principle he illustrated is



applicable to us all in any position we may occupy.

You established but a few weeks ago an association, whose scope is unbounded. If you could realize as I do and others do the great advantages that might come to you as a great, strong organization, every member of which was seeking for information, your example would be followed by every mill centre of the United States, and what is now, in so far as being a stagnant industry in simplicity of converting cotton into cloth, we should have you devoting your life or a very small portion of your time in studying in your surroundings.

Robert Burdette, in his advice to young men, says: You take a basin of water, place your finger in it for twenty-five or thirty seconds, take it out and look at the hole that it left. The size of that hole represents about the impression that advice makes on a young man's mind. Now I trust you are not in that condition, but will accept the advice I have given and strive to make this association of yours, one that will command the respect of your employer, your friends, the public, and yourself.

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HISTORIC STUDIES IN HOME FURNISHING.

## THE ART OF EMBROIDERY AND LACE MAKING.

By MARGARET AINSLEE.

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(CONCLUSION.)

---

The early Gauls also showed great proficiency in the art of embroidery. This taste was fostered by Greek merchants, who brought oriental goods to the periodical fairs held near the monasteries and shrines of saints, so that in time the monasteries became the working centers for the early specimens

of this craftsmanship. Here the sister art of missal-illumination also flourished, many of these cloistral designs furnishing most alluring patterns to the embroiderers. The monastery of St. Gall, Switzerland, contained workrooms for weavers and embroiderers, whose handi-

*Continued on page 9.*

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ART OF EMBROIDERY.—Continued from page 7.

work was greatly encouraged by the church in order to increase the wealth of sacerdotal ornaments. At funerals, too, where the bodies of the dead lay in state, there was great display of embroidered mortuary cloths, the pall of Childeric being worked with 300 golden bees.

Charlemagne the Great encouraged his family, court and subjects to perfect themselves in the art of embroidery, with which he was very fond of decorating his huge person. His obliging sister-in-law accordingly founded many convents in Aquitaine and Provence, where she taught all the inmates the intricacies of the various forms of needlework. There is still preserved in

St. Peter's, Rome, a Greek dalmatic called the "imperial dalmatic," because Charlemagne is said to have worn it when singing high mass as a deacon upon the day of his coronation. Entirely aside from its historic interest it is of the greatest artistic value, and is regarded by modern connoisseurs as the finest piece of embroidery in the world. In addition to the numberless small figures of silver and gold embroidered upon the blue silk foundation are the roundels on front and back representing the last judgment and the transfiguration, embroidered in silk and gold thread, and considered marvels of skill.

In Anglo-Saxon England em-

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broidery made such great strides that it was early known as "Anglicum Opus." Anglo-Norman ladies were also renowned for this kind of work, the best-preserved specimen of their skill being the tapestry (wrongly so-called) in the Cathedral of Bayeux, embroidered by Matilda, wife of William the Conqueror, or by her near relatives. Upon this narrow band of stout linen, 200 feet long, Matilda and her maidens, emulating Helen's needle-working achievements during the Siege of Ivoy, fantastically embroidered over 1,200 figures, forming a needle-wrought epic of the Conquest of England by the Normans. Among the various well-

known early stitches — feather-stitch, crewel-stitch and weaving-stitch—the "Opus Anglicum" so justly celebrated until after the Reign of Henry VIII, seems to have been a modified chain-stitch embroidery, producing a granulated surface; its facial depressions and dimples were simulated by pressing down upon the embroidery a heated metal rod tipped with a small bulb.

Returning crusaders adorned with bejeweled embroidered trappings and mantles necessarily exercised a marked influence upon the sumptuary arts, modifying the early, mystical solemnity of distinction by a tendency toward the intricacies of emblazonry.

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Cut work or applique work, composed of ornamental shapes cut out of silk, wool, velvet or linen, stitched to a foundation and edged with a gold braid or ornamental leather gimp, now came greatly into vogue. In the more elaborate yet less artistic styles, the architectural part of the design was frequently woven, and the sacred figures, worked by the embroiderer upon separate material, were inserted in the panel spaces. This method of ornamentation, combined with graceful, interlacing scrolls, was especially popular for head-dresses, shoes, gloves and other articles of apparel. In the Bayeux Cathedral are "two woolen mittens, with embroidery on the hands of two figures of St. Veroni-

ca surrounded by pearls." Of similar ornamentation must have been Laura's dainty glove, which, so Petrarch tells us in the 166th sonnet, "Gold and silken broidery bore." Pearls and spangles ornamented coats and sleeves in whimsical and extravagant patterns. Great castles of the Middle Ages were partitioned by embroidered hangings; alcoves and recesses and royal dressing rooms were thus ingeniously contrived by means of canopies and side hangings.

While personal and household adornments kept busy the professional embroiderers retained at all petty courts, sacred ornamentation also taxed heavily the ingenuity of the needle workers of the Middle Ages. A favorite pattern for altar

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frontals, statue hangings and ecclesiastical vestments was that of the Jesse tree. This tree was intended to represent the sacred lineage of Jesus-Christ and was but a curious religious adaptation of the genealogical fad which gave rise to coats of arms. A favorite feature of all forms of ornamentation during the Middle Ages, it is thus described by Ernest Lefebvre: "The tree in full leaf rises from Abraham, an old man asleep below; between the interlacements of its leading branches are King David, Solomon and the Virgin Mary; surmounting all is the Crucifixion."

During the renaissance embroidery, like all the other arts, was largely affected by Italian influence. Venice, noted for her exquisite glasswork, reintroduced solid embroidery of vari-colored glass beads, an amplification of Egyptian bead

work and the rude North American Indian's ornamentation in wampum upon belts and moccasins.

Great artists did not consider it a violation of the traditions of their art to make designs for "painting with the needle." The oval medalion sketched by Raphael, depicting the "Dance Round the Golden Calf," was designed for a set of furniture coverings for the coronation chamber. In a similar manner were utilized an Ecce Homo of the Rembrandt school, several portrait pictures, and in Spain many adaptations of the Murillo paintings. Many of these Spanish needle workers attained a crispness of relief compared to wood carving. This relief-embroidery reached such extravagant proportions during the reign of Louis XIV, that it far outstripped the bounds of

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good taste. For instance, in the king's apartments were caryatides fifteen feet high, so boldly embroidered in gold that the effect was rather that of metal bas-relief than of legitimate embroidery.

Such extremes, however, but instanced the growing appetite for everything luxurious and showy. The costume became a mere mass of embroidery. Not satisfied with the thousand and one grotesque little fripperies of dress, many nobles, with nothing better to employ their time, had their robes cut at home and sent for embroidery to the Chinese, whose finesse in that art has never been surpassed.

Queens and their maidens, all ladies of leisure, made the novelties of embroidery their pastime, and their gatherings for the comparison of the newly printed designs and stitches were but fore-runners of that activity which to-

day finds its expression in club life. Catherine de Medici was an adept in this kind of work, and exacted a daily amount of silk needle work from her daughter Mary, the future queen of Scotland. Mme. de Maintenon also was so devoted to the art that she embroidered all the time when out driving, putting on her spectacles and beginning her needle work before the coachman started the horses.

Under the rococo and sylvan-mythological periods true art became more and more debased. When the French revolution closed the volatile eighteenth century the citizens of the new regime found their diversion in picking the jewels from embroidered court suits; then, after the garments were rendered unfit for wear, the gold and silver threads were sent to the

*Continued on page 15.*

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ART OF EMBROIDERY.—Continued from page 13.

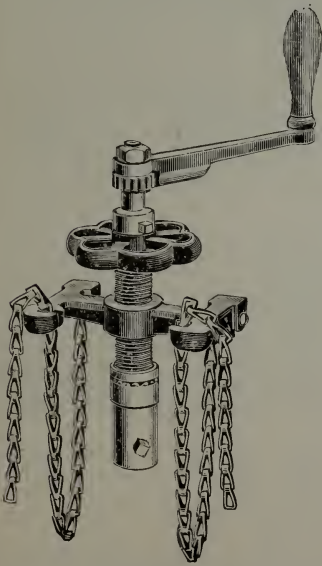
melting pot to be recast for the benefit of the new government.

When machines were invented which could produce rapidly the precise effect which the hand-worker achieved after years of toil embroidery became a superfluous art and its decadence was inevitable. Today, except among a very small class of professionals, it is not undertaken seriously and the amateur work is hardly worth consideration.



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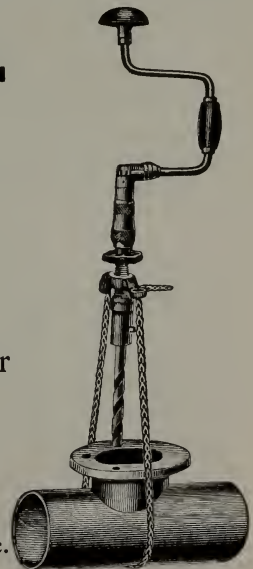
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## THE PERHAM LOOM.

WILL NELSON, Instructor,

Weaving Department, Lowell Textile School.

It has been rightly said, that in no branch of the textile industry, has there been so little improvement in the machines that tend to produce any part of a fabric, as in the weave room.

It is only within the last few years

that changes, to any appreciable extent, have been made in the loom, and it is this machine that plays the most prominent part in the production of textile fabrics: It is the most costly department in the mill; and yet we might truthfully state; the weave room is the best dividend payer, if rightly looked after.

If we can make the above statement with regard to the old style looms, what can be said of the "Perham loom."

It is a single shaft loom, consequently there are no gears to be driven, to impart motion to the usual pick cam shaft, with the result the picking sticks are driven in a very ingenious manner. A worm is so placed on the crank shaft, that a traveller working in the groove of the worm, causes a fork lever to slide the pick ball on a stud, first to one side, then the other. The stud is attached to a small arm, which is fixed to, and revolves with the crank shaft. Underneath the shaft and directly in

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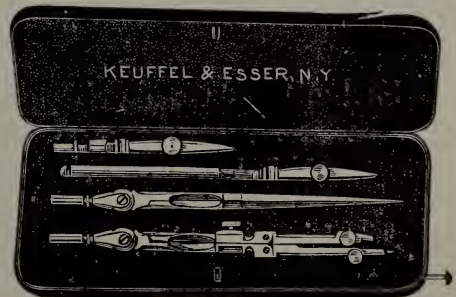
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the path of the pick ball, are two shoes (which by the way have an elevation of about 3-4 of an inch, a striking evidence of the power required to drive the shuttle.) One shoe is connected to the picking arm for one side, the other shoe is connected by a rod that extends across the loom, to the picking arm on the opposite side. By this means an alternate pick motion is obtained.

The harnesses are operated by means of a worm fixed to the outer end of the crank shaft, and a traveller held in the grooves of the worm; the traveller is attached to a bell crank lever, and as it passes

from one side of the worm to the other, it causes the inside end of the lever to be raised or depressed: the end of the lever is connected to a harness roller, placed inside the loom, underneath the harness. There is also a harness roller in the usual place near the arch of the loom. As the bell crank lever is depressed one harness is drawn down and the other is raised; and for the next pick the order is changed.

Apart from the above, the most striking advance has been made in the motion by which the shuttles are controlled when entering or leaving the boxes: A trap is used,

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and its purpose is to bind and release the shuttle. The trap is fixed underneath the breast beam, and a projecting finger is fixed to the dagger rod, the projection on this finger is in close contact with the trap. As the shuttle nears the end of the box, pressure is applied to the binder by means of the trap and finger; the pressure is entirely taken off the shuttle when it has to be picked across the lay, so that very little power is required to drive the shuttle from box to box, and it is done in less time than is required on the ordinary loom; by reason of this, the lay does not need so much sweep, hence there is less chafing of the yarn.

The filling stop-motion is also neatly arranged; a small extension is fixed to the usual elbow lever, and this is so placed that as the pick ball revolves with the shaft it comes in contact with this projection.

There has also been added a shuttle-changing device. The hopper is supported on a stud fixed to the arch of the loom. The bottom of the hopper is connected to the lay and directly over the shuttle box. When the filling breaks, the drawing back of the fork slide causes a catch-finger to be raised, the catch on the finger comes in contact with a small arm that descends from a swing bar attached to the hopper; three wire supports are connected to this bar, one at each end and one at the centre. The centre one supports and prevents the shuttles from dropping into the shuttle box. As the small arm is drawn out the centre support is also drawn from under the shuttles, at the same time, the two end supports being fixed the height of one shuttle above the centre support, pass in and only allow one shuttle to drop into the box.

An alumnium slide is placed

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near the entrance of shuttle box. This slide is connected to the swing bar, so that as the small arm is drawn out the slide passes in front of the entrance of the box, this causes the shuttle to be shot out into a receptacle provided for the purpose. Summed up as a whole, it is a marvelous invention.

So that we can clearly understand wherein lies the benefit that is to be and will be derived from the adoption of what has been termed the loom that will revolutionize the weaving industry, namely the "Perham Loom," let us

consider some of the costly features in the ordinary type of loom, that are eliminated in this loom.

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here is a loom about which it can positively be stated only a minimum of supplies are consumed. When a machine is so constructed that it saves cost in the supplies it needs, there is more in it than appears on the surface. For example, the fewer breakages there are, the greater the production, consequent upon the greater length of actual running time. A better quality of goods is produced, because there is less alteration of parts, and less fixing required, which always tends to better quality, and a loom that runs with little fixing most certainly gives the fixer more time to attend to the rest of his section.

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from this, and it is in this point where lies the secret of the loom's power. The lay sole and breast beam of an ordinary loom requires to be made of well seasoned wood, and wood without a flaw, or there would soon be a break. But the contact of the dagger against the receiver is so slight when this loom bangs off, that you do not know it has taken place until you see the shuttle is not in the box, it appearing as if the loom had been stopped by the shipper handle.

The benefits to be derived from the use of a machine that embodies the saving clauses mentioned above are far reaching, for anything that tends to lessen the jar and worry that is common to the weave room is of tremendous benefit from an economic standpoint.

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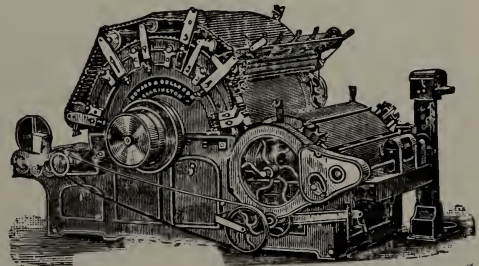
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the merits and you will be convinced beyond a doubt of their superiority.

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## SIZING INGREDIENTS, ETC.

By F. W. H.

In one of the examinations arranged by the City and Guilds of London Institute, a few years ago, appeared the following question: What are the properties, etc., of the following substances used in sizing—wheat flour, sago flour, farina, mutton and beef tallow, paraffin wax, china clay, chlorides of zinc, and magnesium?

The above list of ingredients does not comprise all the substances that are used in the process of sizing at the present time, to say nothing of the catalogue of peculiar ingredients that were employed in the early ages of the cotton manufacture. They are, however, the most generally used, and some of

them enter into the composition of all size mixtures. As they are placed in the above list, they fall into the three main divisions—vegetable, animal, and mineral. Though a very great number of substances have been experimented with in order to find an effective and economical size, the flour of wheat enters largely into the composition of most size mixings, especially the medium, namely, those which are intended to add from 25 to 75 per cent. of weight to the yarn. There is a great difference between some flours, English flour having a very good name for sizing purposes, whilst Egyptian, Indian, and others are much inferior.

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The operation of sizing is for the purpose of thoroughly saturating the yarn, and not merely coating the yarn with the adhesive substance, so as to lay all the fibres of the yarn, and enable it to withstand the friction of the healds and reed and the strain of shedding, etc. As the lighter qualities of cloth require less of this friction and strain than the heavier qualities, comparatively little flour and other substances are required; in fact, only just sufficient to enable the yarn to pass through the loom, this being called pure size.

Sago flour is now much used in light sizing, and, in fact, in many mills has entirely superseded wheat flour. This is also the case with farina, though this latter, owing to

the somewhat harsh "feel" given to the yarn, requires the addition of a little tallow. For a pure size, it may be considered that the mixing requires practically nothing but some adhesive flour, though chloride of zinc may be added to prevent mildew, if the cloth is not to be bleached or dyed.

Mutton or beef tallow are used for the purpose of "softening" the size, and preventing it from leaving the yarn whilst undergoing the friction of weaving. As a softener beef tallow is the better, mutton in fact is considered somewhat stiff. Softeners are advantageous in all mixings, though in the heavily-sized goods mineral softeners are always used in addition. Paraffin wax is a mineral substance, which is in

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very common use. Some manufacturers appear to use it indiscriminately for all classes of yarns, but as alkalis have little or no effect upon it paraffin wax should not be used for yarns when the cloth is required to be bleached, dyed, or printed upon.

China clay is the principal substance used in the case of heavy-sized yarns. Its use in weaving is very beneficial, as it enables a much inferior class of yarn to be woven than would be possible without it. In order that the China clay shall adhere to the yarn it is necessary that softeners and certain moisture absorbing substances be used, and in the case of India shirtings, etc., special arrangements for providing the necessary moisture such as steaming, etc., must be made. China clay gives a soft smooth feel to the yarn and cloth, and makes the cloth appear full and substantial. A considerable proportion of the China

clay used in Lancashire comes from Devon and Cornwall, though the best quality comes from China, where it was first used.

The chlorides of magnesium and zinc are very extensively used in the sizing of the heavier mixings; they are generally used in conjunction with each other, the chloride of zinc being moisture-absorbing, and a very effective preventive of mildew and decomposition. The chloride of magnesium is used for absorbing moisture, and thus keeping the yarn soft and flexible, and enabling the size to adhere to the yarn.

The above list of ingredients must be suitably proportioned to each other, as for instance if the clay is not provided with the proper proportion of chloride the clay will fall off. Sometimes a little glue is added to the size in order to fix the clay, whilst other sizers find that soap is equally effective. Formerly

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sizers held very divergent views as to the properties of the ingredients and the proportion of each required, as well as to the mechan-

ical arrangements, but now these are better understood, and there is more uniformity in the operation of sizing.

### AS OTHERS SEE US.

The following clipping from the New York Journal of Commerce was not inspired from Lowell. It is one of many voluntary acknowledgments of the proud position Lowell occupies to the great textile industry of the country and to the practical character of educational movements originating there and that have developed directly out of its leading industries, making directly for the increased wealth of the Commonwealth and higher citizenship in the industrial classes:

Massachusetts is an old State as American communities go, but one of the most important of its cities

has just celebrated its seventy-fifth anniversary. Lowell, with a population of 94,000, an increase of 22.2 per cent. in ten years, had about 2000 inhabitants when it was incorporated March 1, 1826. This population was entirely due to the location of cotton mills to which the site afforded a superior water power.

The general interest in Lowell is due to the fact that the history of the city is the history of the American cotton manufacture. Trade with England being entirely cut off in 1813, Francis Cabot Lowell, with his brother-in-law,

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Patrick Tracy Jackson, and Paul Moody, a mechanical genius, organized the Boston Manufacturing company and engaged in the manufacture of cottons. His great grandson and namesake, Judge Lowell, said at the celebration that it was his ancestor who conceived the idea of spinning and weaving under the same roof. The power loom was in operation in England, but it was a closely guarded secret; "it had to be reinvented, therefore, and this was done by Mr. Moody and Mr. Lowell working together."

When this enterprise lost the blessings of war, under which it came into being, it sought the best available substitute and obtained tariff protection. At that time there was much opposition in New England, where the interests were mainly commercial, to this policy; but John C. Calhoun brought to it a considerable Southern support because it promised new customers

for cotton. Whatever arguments may be offered for one system or another of trade regulation, it is only the obvious and immediate self-interest, or what is believed to be such, of the dominant power which controls legislation. With the growth of manufacturing New England became strongly protectionist and Daniel Webster was obliged to change his position to keep in line with his people, while the South, devoting every energy to cotton and tobacco, and buying all manufactured goods, became the seat of free trade.

Mr. Lowell's mill was established in Waltham. In 1822, five years after his death, the insufficiency of the water power led its owner to look for another location and they selected the spot now covered by the city of Lowell and organized the Merrimack Manufacturing Co., with Mr. Kirk Booth as agent, and Mr. Ezra Worthen as superinten-

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WATCHES.

DIAMONDS.

**GRANT JEWELRY COMPANY,**

64 Merrimack Street,

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LOWELL, MASS.

dent. Two years later Mr. Worthen was succeeded by Mr. Warren Colburn.

The intellectual life and the industrial activity of New England seem to have had a near if not a common origin. The orator of the day said somewhat flippantly that Mr. Colburn "will long be remembered as the author of a certain 'Mental Arithmetic' which so taxed the patience and tangled the brains of the school boys and girls as to drive them almost to despair." But the "Evangelist" of this city lately reproduced portions of an address at an education conference by Mr. Lyman Whiting, who spoke of this arithmetic as "a little book which wrought on the young life of New England as no other little book except the New England primer has ever done. . . . It had no rules; it made the scholar think it out." Amherst students propagated it through in the district schools in the winter; it was said derisively that they could teach

nothing else. Mary Lyon, founder of Mt. Holyoke seminary, put it first among her text books. It began with the inquiry as to the number of fingers and thumbs the pupil had, and the simplicity of this aroused heated opposition by parents who would not admit that their children had to be sent to school to learn how many fingers they had. But it was the starting point of Mr. Colburn's method of setting children to observe and think rather than to memorize rules. Mr. Whiting says the Colburn arithmetic simplified all text books, and he credits it with an intellectual revolution in New England.

It is not uninteresting to notice that this stimulus to accurate thinking, this potent influence over the educational system of New England and therefore over the educational system of very much of the country, emanated from the pioneer mill in the City of Spindles. The intellectual life and the industrial activity of New England, which thus started together, have never parted company.

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### A DOLLAR A WEEK.

Clubs or parties formed for the purpose of touring a-wheel to Buffalo this summer are now being organized in a number of localities. Some of these parties are of the "personally conducted" order—a certain stipulated amount being paid in installments or otherwise, to the conductor of the party who assumes all responsibility and attends to all the business details. In other cases, clubs are formed on the co-operative plan, officers are appointed or elected and weekly or monthly payments made to the club treasurer.

Several important points must be considered in planning for a successful club cycling tour. In the first place, there should be, as a rule, a large enough party to

create enthusiasm from mere numbers, and the feeling that the trip is an event. Twenty or thirty makes a satisfactory number for a club tour. A party of this size commands attention and respect from landlords, and yet is not so numerous that the members can not be comfortably housed and fed. The manager of a party can not well look after more than 20 or 30 cyclists unless the trip is a short one, and where large hotels can be reached each day.

On the selection of the route depends much of the success of the tour. The best route is not always the shortest. Due consideration must be given to the grades, condition of the roads and side paths, scenic, historic and other

---

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LOWELL, MASS.

points of interest, and last but not least, to the hotel accommodations en route. In addition to the information regarding the best routes and condition of the road to be obtained from the road books and maps published by the different Divisions of the League of American Wheelmen, much valuable information relating to points of interest, historical, etc., may be obtained from the folders and other advertising matter issued by the principal railroads. If however, in planning a tour, information is desired that is not to be obtained from other sources at your command, you are advised to apply to the Publicity Department of the Pan American Exposition.

Set each day's run at 50 miles and under—under is better. In order to reach a certain point, a few long runs may be necessary, but do not think the average wheel-

man can ride 75 miles a day for a week, and spend his evenings "doing the sights." If each day's run is stated in the itinerary, be sure that it is never under-estimated. If it should be, he is apt to find fault in regard to every extra inch he has to wheel. This amusing trait is peculiar to cyclists. They claim to like to ride—and they really do—but compel them to ride a mile more than they expect to, and they immediately become very much abused individuals.

After deciding on the size of the party the route to be followed, and the number of miles to be ridden each day, select the various stopping places, and enter into correspondence immediately, with the proprietors of the hotels in the numerous towns selected for stopping places. It is not always the best policy to endeavor to secure reduced rates from landlords,

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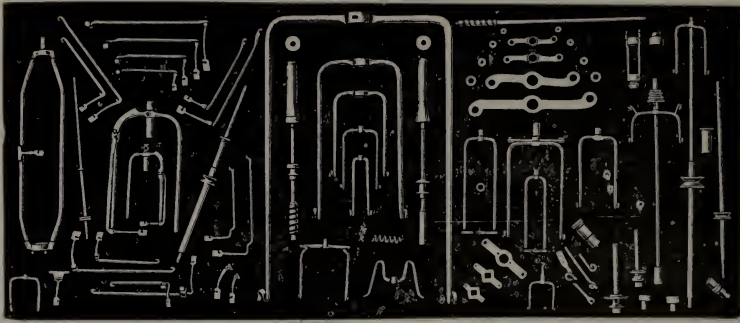
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but rather to insist on only two in a room with separate beds, if possible, and extra good meals. Landlords are often ready to give reduced rates, but if they do, they are apt to try and get even in some other which may make matters unpleasant. On the contrary, if they are asked for no reduction, but for a little extra bill of fare, they become eager to treat you well, and everything will run smoothly.

On the wheel, there should be taken as little baggage as possible if a comfortable tour is the thing desired. The bulkier baggage of the party should be sent ahead each day by express. In addition, each member of the party should be advised to forward to the hotel decided upon in Buffalo, a supply of

ordinary clothing before leaving home. This done, he will find his trip to the Pan-American Exposition made much more comfortable and enjoyable. Nothing rests one more after a long ride than getting into his regular clothes. Furnish "stickers" with the name and address of the Buffalo hotel written plainly thereon, in order to expedite delivery of baggage, or to enable same to be easily traced if miscarried.

In organizing a party for a tour to Buffalo, it will be safe to estimate the expense per day as follows: \$3 per day for hotel expenses (about \$2.50 will be the average hotel bill, the other half dollar will meet incidental expenses that are continually cropping out, and help

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to pay for postage and printing) To this add the amount required for railroad and steamboat fares, and other known expenses, and then add ten dollars for unforeseen contingencies. Of course less would do, and a great deal more can be spent.

Making advance arrangements not only entails considerable care and labor upon the promoter or manager of the tour, but renders it necessary for the party to make each day's journey on schedule time. Circumstances, however, sometimes arise which make delays advisable or render progress inconvenient, as for instance, a severe rain storm which may make the roads impassable. In this case it will be necessary to proceed by train or boat to the place appointed for the midday meal and by the same method to the stopping place for the night. Should such devia-

tions from the program occur the manager will have reason to congratulate himself on his foresight in providing an excess fund for contingencies.

The expense of touring can be hammered down very fine if it is desired. In many instances, \$2.00 per day would be an ample allowance for hotel expenses. This price will get good accommodations in almost any part of the country. It is well to remember, however, that the old adage, the way to a man's heart is through his stomach, applies particularly to wheelmen after a long day's run. A man who is hungry and tired sees no good in anything and begins to find fault on the slightest provocation. He will criticise just as freely, whether he has paid a very low price or a high one for the tour. If, however, he finds on arriving at his destination for the evening, a comfortable

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hotel with abundant bathing facilities, and his luggage awaiting him (thus enabling him, after his bath and rub down, to make a complete change of clothing from his cap down to his shoes, before dinner), he is apt to think less of the almighty dollar and more of his manager who had so thoroughly prepared for his comfort in advance. Consequently it is wise for the manager to make his estimate high enough to allow him to provide for all contingencies which may arise, affecting the comfort of the members of his party.

After being thus well cared for from day to day, the tourist will, on his return home, reflect with pleasure on the many agreeable

incidents en route, on the varied beauties of Buffalo, the Wheelman's Paradise, on the grand scenery of Niagara Falls and on the manifold glories of the Pan-American Exposition.

Those who took part in the famous "Big 4," still remember with pleasure that perfectly managed tour from Buffalo—through Canada, the Thousand Islands and the valleys of the Mohawk and the Hudson—to New York City in 1885. Long after the Exposition of 1901 has passed into history, the reminiscences of a well planned and successfully carried out trip to Buffalo will prove as lasting a pleasure to the participants.

W. SHELDON BULL.

**GLEANINGS FROM CONSULAR REPORTS.**

RAFIA FIBRE IN MADAGASCAR.

William H. Hunt, Vice-Consul

at Tamatave, writes: Rofia, or as it is generally spelled in commerce



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"raffia" or "rafa," is the Malagasy name of a palm which furnishes a staple article of commerce called rafia fibre. It is indigenous to Madagascar, and is to be met with everywhere on the coasts, needing no cultivation or attention of any kind. It is not a stately palm, but sends its enormous branches from near the ground. In a fine specimen one branch is almost a tree in itself. The rib of each branch is as much as twenty feet long, of a pearly gray color, smooth and shiny, flat on the inner surface, but otherwise round, without any knots, and so hard that in perhaps nine cases out of ten a rifle-ball would rebound therefrom. At the base it is as large as an ordinary champagne bottle, and tapers to a point at the top. The inside consists of a light pith which can be split into layers of any thickness. Possibly it is this or an analogous production which is used for making pith helmets in the East.

Naturally these ribs combine

great strength with wonderful lightness, and are used for shafts for "filanjanas" or palanquins, ladders and other purposes, but otherwise have no particular commercial value.

It is the pinnifoliate of these branches which produce the rafia fiber of commerce. One palm branch, or frond, will produce from eighty to one hundred long green leaves from two to five feet in length, like the leaves of the sugar cane, but of a dark lustrous green, and thicker and stiffer. These, again contain a round and pliant rib, which the natives utilize for making baskets and dredges for catching small fish and shrimps in the rivers after they have stripped off the green part which furnishes the fiber.

The under part of this green leaf (which is not exposed to the light, as it remains folded) is of a pale greenish-yellow color, and from that side the inner skin can be peeled off in the same manner as the skin on the outside of a pea pod, except that it peels off straight to the tip without breaking. It is

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Merrimack and John Sts. - Lowell, Mass.

then of the palest green, and after being dried in the sun assumes a light straw color. This is the rafia fiber of commerce.

It was originally exploited by the natives for use in articles of clothing. The men bring in the fronds and women and girls weave it on hand-loom of any coarseness or fineness. Woven just as it is peeled off from the fronds it forms a kind of sacking used for wrapping goods, while the perfection of the art, as known by the Hovas only, is to weave a tissue of which the warp is rafia fibre split infinitesimally fine and the weft of white silk. This gives an article called silk lamba, which brings fancy prices in Europe and America. The coast tribes use it for clothing, but of mediocre fineness, with dyed stripes of indigo, saffron, black and a dirty green. It is a cold, comfortable-looking material and refuses to adapt itself to any folds that a sculptor would care to copy; and when two natives come down the street clad in brand new rafia

shirts they produce a noise similar to that of two wire meat covers rubbing together.

Rafia fiber is now used in the market, I understand, entirely by nurserymen, gardeners, etc., for tying up vines and flowers, and possibly for grafting. It possesses the advantage of being as soft as silk and is not affected by moisture or change of temperature so as to risk cutting or wounding the most delicate tendrils; and it does not break or ravel when folded or knotted. These qualities bring it into use all over Europe, and consequently maintains its price. It is virtually inexhaustible in Madagascar, the supply being limited only by the scarcity of labor.

For export the fiber is merely collected in large skeins, twisted up or plaited, and then baled like raw cotton.

Madagascar exports about 20,000 bales annually, and the present prices range from 78 to 80 francs (\$15.05 to \$15.44) per bale, f. o. b. New York.



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**SAMUEL KERSHAW,**

Note the address,

**114 CENTRAL STREET,**

**Lowell, Mass.**

# Lowell Textile Journal

---

## COTTON FABRICS.

THEIR MANIPULATION FROM THE FIELD TO THE LOOM.

---

Following is the greater portion of the paper on "Picking and Carding Cotton Fibres," prepared and read by Mr. F. E. Saunders before the Lowell Textile association.

The subject of manipulating cotton fibres from the field to the loom is one that has been treated by very many able writers from a scientific standpoint. Much valuable information has been placed in reach of textile workers throughout New England manufacturing centres, and if carefully studied and put to practical use will be of great value. In preparing a paper on the subject, the writer has a desire to present some of the salient points of the cause and effects that textile workers come in contact with every day.

The statement was once made by a manufacturer well known in Lowell that good carding was the soul of good work. The question for discussion is how to get even picking and carding, and I ask for

an open and free discussion. The question is often asked by the spinner, why is it the roving is so uneven? In reply the writer will say that the carders are not angels of light; there are certain impossibilities that the ingenuity of man has not been able to overcome, and that includes carders of first quality. Spinners will take notice that carders do not claim the power to control the atmospheric changes that are continually taking place. Sometimes dry and windy, then again cold and wet, electricity strong enough at times to preclude the possibility of smooth, even carding. Carders have no control over the building and placing of the picking and carding machines. They are given oversight of certain responsibilities, and one is to make even roving for the spinner.

This, I am quite sure, brings us to the point of how we can make even roving. First, there comes the process of picking. How shall

we arrange our machines in order to get a good, even lap that will produce an even coil of sliver at the coiler of the revolving flat card? Large sums of money have been expended in perfecting up-to-date machines, especially has this been the case since the English revolving flat card has come into universal use. It was found that the card called for a high grade lap, in order to deliver an even grade of carding.

I desire at this time to present for your consideration two methods of manipulating cotton fibres during the process of picking. One is the old system of removing the cotton from the feed roll by the use of the three-arm beater blades. That has always been a source of trouble to the carder. There seems to be quite a difference of opinion as to whether or not any injury results from the force of the beater blades as they strike the body of cotton fibres when presented by the feed rolls. A superintendent of one of our largest machine shops said quite recently, "I do not pay any attention to the talk that I hear about the injury done to cotton fibres by the action of the beater blades. Cotton fibres are too elastic to be at all affected by the stroke of beater blades, and they are too short to admit of their being cut or weakened in such a

manner." Now, this is one way of looking at it. I find that there are two sides to this question. Other men hold very different views on this subject, and are decidedly outspoken in regard to this matter. There is one thing quite evident, and that is, that the action of the beater blades often changes the fibres as they pass through the feed rolls into a conglomerated mass of lumpy and stringy cotton. Certainly it was not in this condition before it passed to the action of these rigid beater blades. There is trouble somewhere, either in the setting of the feed rolls or in the condition of the beater arms. If the beaters have run a long time the blades are smooth and the action of these upon the cotton is of such a nature as to make three or four blows necessary before the cotton yields, whereas one blow ought to detach the cotton and pass it along to the condensing cage. You may take a finished picker lap, made under these conditions, and hold it up before a window, and carefully unroll it; and you will find that it looks very much like a mackerel sky. In other words, the sheet of cotton as it is rolled from the lap is full of thick and thin places. One of the worst features about single carding is this condition of laps.

*Continued on page 6.*





# EVENING DESIGN GRADUATING CLASS.

J. T. CHEETHAM, H. L. REYNOLDS, R. HUNTER, W. O. BIZZELL, J. C. MINGE,  
 E. B. SAUNDERS, FENWICK CUMLEYBY, J. T. NOBLE.

*Continued from page 4.*

We now come to discuss the second system of preparing cotton for the cards. Along the line of improvements that have been applied to pickers during the last five or six years, and especially the past four years, no one has met the wants of the manufacturer in securing even laps like that of the carding beater built by the Kitson company of this city. More than two thousand have been placed in their pickers. This improved beater has three arms carrying lags in which are inserted tempered steel pins. The curved top and bottom of each lag are made eccentric with each other and, therefore, since each lag is thinner at the front than at the back, the penetration of the different rows of pins belonging to each lag is graded, the first rows passing the feed rolls so as to leave a considerable interval between, and the last rows approaching the feed rolls closely and penetrating the cotton. By this graded penetration the cotton is drawn out gently or combed. Too sudden attack upon it is avoided, and the use of pins hitherto deemed unsafe is rendered not only safe, but advantageous. The pins are varied in fineness and length to suit the class of work for which they are to be used. With the improvements in carding machinery and

with the greater regularity required in the numbers spun in cotton mills, together with the abolition of double carding, increased regularity in laps has become a necessity. The hard pressing of cotton in the hydraulic bailing press makes it very difficult to separate the fibres into their original fluffy condition. This may be seen behind the cards in any lap when the cotton is treated in the old process. It is found that the carding beater opens the cotton so that it is much finer, lighter and more regular than when treated by the old system. Lumps which would withstand the ordinary beater are invariably opened by the carding beater and without injury. In order to get even carding, the finished picker lap must be even, inch for inch, thus delivering to the shell feed of card a uniform body of cotton fibres.

The first principle of carding on the English revolving flat card commences when the points of teeth on the steel garnet licker-in come in contact with the cotton fibres as presented in bulk, between the feed roll and shell feed. We now can see the necessity of feeding a uniform body of cotton fibres to the points of teeth on the licker-in. When a lap is made and left in the condition previously mentioned as looking like a mackerel sky, or in

other words, with thick and thin places, then uneven carding will be the result from the fact that the feed roll will deliver to the points of teeth of liker-in fluctuating quantities of cotton fibres that are delivered to the carding surfaces in the same proportion, and the result is cloudy carding. In other words, to illustrate, suppose a finisher lap 40x36 inches, weighing 13 ounces per yard, is placed at the feed roll of a revolving flat card, assuming that the lap is even, inch for inch, we find that the yard of lap contains 1440 square inches, and that each one weighs 4 grains, giving us 72,000 cotton fibres to every inch of cotton. If it were possible to make such laps, the uniformity of the sliver would be as near perfect as any process of carding could make it. But right here I want to ask what the condition of the finished picker laps is when formulated by the old rigid beater system. Is it not a well known fact that the unevenness of the lap precludes the possibility of even carding? Instead of weighing 4 grains to the inch, the variation will run from 1 up to 7 grains. One grain contains 18,000 fibres, while seven grains contain 126,000 fibres, and yet some of our manufacturers wonder why they get cloudy carding and uneven yarn. The wonder is that with such a combination they get

as good work as they do. I find, from careful observation, that the picker laps made from the carding beater system, although in prime condition, are more or less uneven, but the nearer we come to eliminating the heavy spots the better will our grade of carding be.

The combination of carding points is the scientific principle of carding cotton fibres, and when kept in proper condition will produce a high grade quality of carding. I am aware that very many of our manufacturers hold to the idea that the processes of carding and doubling will eliminate a large per cent. of unevenness. This theory is not tenable. Place at the shell feed of a revolving flat card an uneven lap full of thick and thin places, and the immediate result will be a low grade of carding. The carding surfaces have enough to do, even though the lap is as even as it is possible to make it. The process of carding cotton fibres is a delicate one, and it requires constant care to keep the carding surfaces in prime condition.

We will now pass to notice the weight of card sliver after being condensed at the coilers. Hardly any two mills are alike. The weight of drawing at coilers can be found anywhere from 50 up to 70 grains per yard. The average would be from 55 to 60 grains. Now, then,



with a 13 ounce lap how close can we run to 60 grains? Any carder will find on an average that the card will deliver 60 grains per yard. Some one may want to know what the variations are. Now that is just what I desire to touch upon. Builders of picker machinery claim that there can be but very slight variation from start to finish with an even lap. If this is the case, why is it that the variation from start to finish is 10 per cent.? Why is it that a finished picker lap placed at the shell feed of a card is lighter in weight at the coiler when first placed at the card than when it is running out? The reason to me is obvious from the fact that the web of cotton while being wound in the formation of a lap is stretched as the lap increases in circumference. This serious defect cannot be so readily discovered in the weight of lap yard for yard as it can when carded and weighed at the coilers.

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### *PAN-AMERICAN MUSIC.*

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One of the chief architectural features at the Pan-American Exposition will be the splendid Temple of Music. This will be the centre for musical interests at the great All-American Exposition. Music lovers will naturally wend their way to this building very

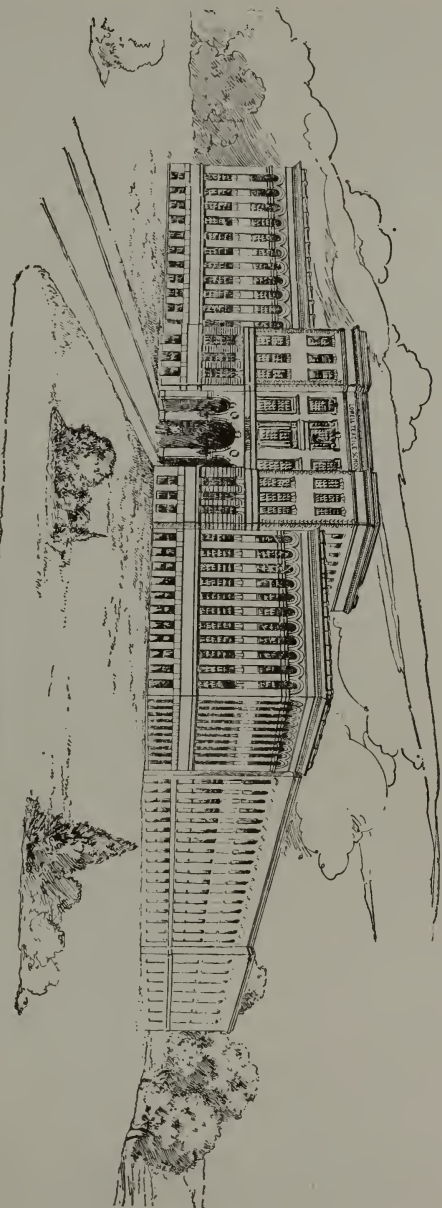
soon after their arrival upon the grounds, and both here and from the band stands in the great Esplanade and in the Plaza they will always find some entertainment in progress which will appeal to their love of musical art. The Music Temple is well along toward com-



pletion. Its architecture is a free treatment of the Spanish Renaissance, it being octagonal in form, with pavilions at the corners. The grand entrance is at the corner of the Esplanade and Court of Fountains, the spacious courts upon which most of the principal buildings of the exposition have their frontage. The cornice and balustrade are of elaborate composition, the latter bearing names familiar to the musical world.

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To be Erected at Lowell, the State and Frederick F. Ayer of New York City, Each Having Contributed \$70,000.

This building, for which the contract has been awarded, will be 260 ft. long by 80 feet deep and be faced with light pressed brick. It is to be first-class construction throughout. The site of 3 1-2 acres is on a high elevation on the north bank of Merrimack river, overlooking Pawtucket falls, the original source of the power that drives the larger mills and shops of Lowell. The site is a fitting one for a school that embraces within its scope instruction in the manipulation of all commercial fibres

and all textile processes, from the raw material to the finished fabric, including the allied arts and sciences of chemistry, mechanics, design, etc., for it is here that the founders of the textile industry in this country first established power loom weaving on an extensive scale. It is expected that this building will be ready for occupancy before the close of this calendar year. Lockwood, Greene & Co., mill architects and engineers, Boston, are the architects.

The school now has in operation courses which represent all of the important lines of textile man-

ufacture, with machinery to illustrate practical operations on full-size working scale. There are courses in cotton and wool manufacturing, textile designing, general chemistry, weaving, dyeing, commercial languages, etc., etc., and the necessary machines to establish the knitting and finishing departments are now being installed. The school has, since its inception, occupied rented quarters, which have proved inadequate to its needs. The new building, being designed especially for the school, will go far to establish the institution as a textile university. There are now 421 pupils.





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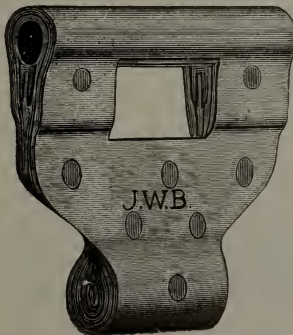
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The dobby is much better than any tappet motion as a means of production of small figured weaves, as in the case of changing from one pattern to another there is little to alter beyond the cards or lags, supposing the healds are to remain the same, whilst in the case such as the Woodcroft, the whole tapet must be taken off, its sections re-arranged, and then gaited up again, which often take a long time.

There are various kinds of dobbyes, which may be subdivided into single and double-lift machines.

card and lag machines, open-shed and crossed-shed machines, etc, Each of these different types is more suitable for some particular class of cloth, though sometimes preference is given to some particular make of machine from prejudice, or from ignorance of the capabilities of other machines.

The simplest type of dobby is that known as the single-lift card dobby. This machine was formerly much more in use than it is now, though it still seems to be a great favorite in technical schools owing to its simplicity of construction

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and mode of working, and its adaptability to change of pattern. Its action is almost identical with that of the single-lift Jacquard machine, though as its purpose is the raising of healds, and not the raising of a small number of ends some distance apart, the number of hooks raised must be very limited. All dobbies are placed on the top of the loom, some over the centre, others over one side, accordingly as the action of the dobby is applied to single or compounded shedding levers or jacks as they are called.

The single-lift card dobby consist of one or more griffes, which are raised every pick by means of a crank or eccentric cam on the

crank shaft of the loom. These griffes or knives are for the purpose of raising the vertical hooks to which the healds are connected. A wire needle is connected to each hook, the rear end of which is provided with an elongated loop, through which a pin is inserted to keep the needle in its place, and the point of the needle passes through a needle board, projecting about 3-8 of an inch. An oblong barrel or cylinder, as it is mis-called, presents a fresh card to the points of the needles each pick, the cards being perforated according to the way in which the hooks are required to be raised, and the cards are laced together in consecutive order.

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When a blank space in a card is presented to the needle, the hook attached to the needle is pressed backwards and is missed by the rising griffe, but when one of the holes in a card is presented, the needle permits the hook to be caught up by the rising griffe and so raise the heald. The hooks are kept pressed forward by means of spiral springs pressing against the rear ends, or by the hooks being shaped so that part of each hook acts as a spring, and by pressing against a part of the machine keeps the upper end pressed forward.

These machines are of the negative shedding order, springs being required to depress the healds after shedding. When a considerable number of healds are in use, it is advantageous to use a machine which raises the healds higher and

depresses them lower the further they are from the front of the loom. The single-lift dobby gives a perfectly open shed, as the selected ends are raised from the lowest position to the highest at each pick; this preventing the loom from running at a very high rate of speed. The card cylinders or card dobbies are four-sided, whilst in lag dobbies the lag barrels are arranged in eight sockets.

In theory, any shedding motion should raise the healds slowly at first, gradually increasing in speed towards the centre of the traverse, then decreasing in speed till a pause is obtained to allow the shuttle to cross the loom. The tappet shedding is the best means of obtaining this eccentricity of motion, as the tappet may be made of such shape as to permit of any length of dwell

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or any desired motion of the healds. The dobby is not capable of being, so arranged as to permit of much dwell for the passage of the shuttle, as motion is communicated to the griffes by means of a crank or cam. The healds and yarn are therefore not treated so gently by a dobby as by tappet shedding.

Sometimes these single-lift card dobbies are arranged so that the cards can give two or three different patterns. The cards are cut with three rows of holes, each row

of different weave. The needle board through which the ends of the needles pass is capable of being raised or depressed so as to allow the points of the needles to come in contact with each of the rows of holes in the cards, and so the weave of the cloth may be varied. This method is used in the weaving of towels, serviettes, etc., in which the body of the cloth may be of certain weaves such as huckaback, honeycomb, etc., whilst the ends may be of twill and plain or other weaves.

## GLEANINGS FROM CONSULAR REPORTS.

AMERICAN UNDERWEAR IN ENGLAND.

S. C. McFarland, Consul, Nottingham, England, writes: English discussion of the American commercial invasion continues to grow more pointed and frank.

Hardly an issue of the leading English papers appears without reference to American competition in some line. Within the past two years, the tone of such articles has become serious, and economic

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writers are kept busy attempting to find acceptable explanations for American success.

Leicester, in this consular district, is the seat of two great industries—the manufacture of boots and shoes and of hosiery (including underwear). A few years ago, large quantities of boots and shoes were exported to the United States. Now, not only are there no exports, but enterprising American firms have actually opened retail stores there, while much of the machinery used is of American make.

Hosiery exports a few years ago were very large. They are now comparatively small, and, as shown in previous reports, are constantly declining in volume; and, to cap the climax, American goods are actually selling at retail in this market. As this is the very home of the British industry, it is not astonishing that such a fact should

come as a shock to natural British pride, and that its importance, as disclosing the general trend of trade, should be minimized and, as a rule, made light of. The leading trade organ—the Hosiery Trade Journal, of Leicester—attempts in the following suggestive article, in its current number, to bring the more serious phases of the matter to the attention of its readers:

The report from the British Consul at Philadelphia strengthens the fact that America is making fast strides in the manufacture of hosiery of all kinds, and that in the near future American goods will be met in many markets where same have been up to the present unknown. As such advancement takes place, so will decrease the importation by that country of hosiery goods, and those countries which have in the past supplied

*Continued on page 19.*

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**216 Central Street, - LOWELL, MASS.***Continued from page 17.*

America with hosiery will have to find other markets. This is no surmise, for at the present time the exports of hosiery from both Germany and England are nothing like what they were in years past, and, as stated, have the tendency to still further decrease.

We have previously commented on the importation of cut underwear from the United States into England, and there are those who are inclined to treat this question as a mere "bogie;" but when such goods can be seen exhibited in the windows of such hosiery towns as Nottingham and Leicester, then the "bogie" has assuredly taken some form of reality. Critics say the goods are not so well knitted as English fabrics, but certainly in fleeced goods the fleecing has had the special study of the United States manufacturer.

**DESINGING CLASS.**

The graduates of the evening designing class of the Lowell Textile school gave Professor Fenwick Umpleby and his two assistants, J. W. Barr and A. J. Pradel, a banquet at his residence, 83 Third street. The committee of management consisted of Edward Burnett Saunders, John James Cheetam, Wilfred Lord, William Oscar Buzzell, Hiram Leland Reynolds, Thomas Barnes Hitchcock, Noah Brooks, Jackson Chadwick Minge and John T. Noble.

The evening was until a late hour given up to instrumental music, singing, readings and speaking. Refreshments were served by a local caterer.

Advertize in the Lowell Textile Journal, it will pay you.

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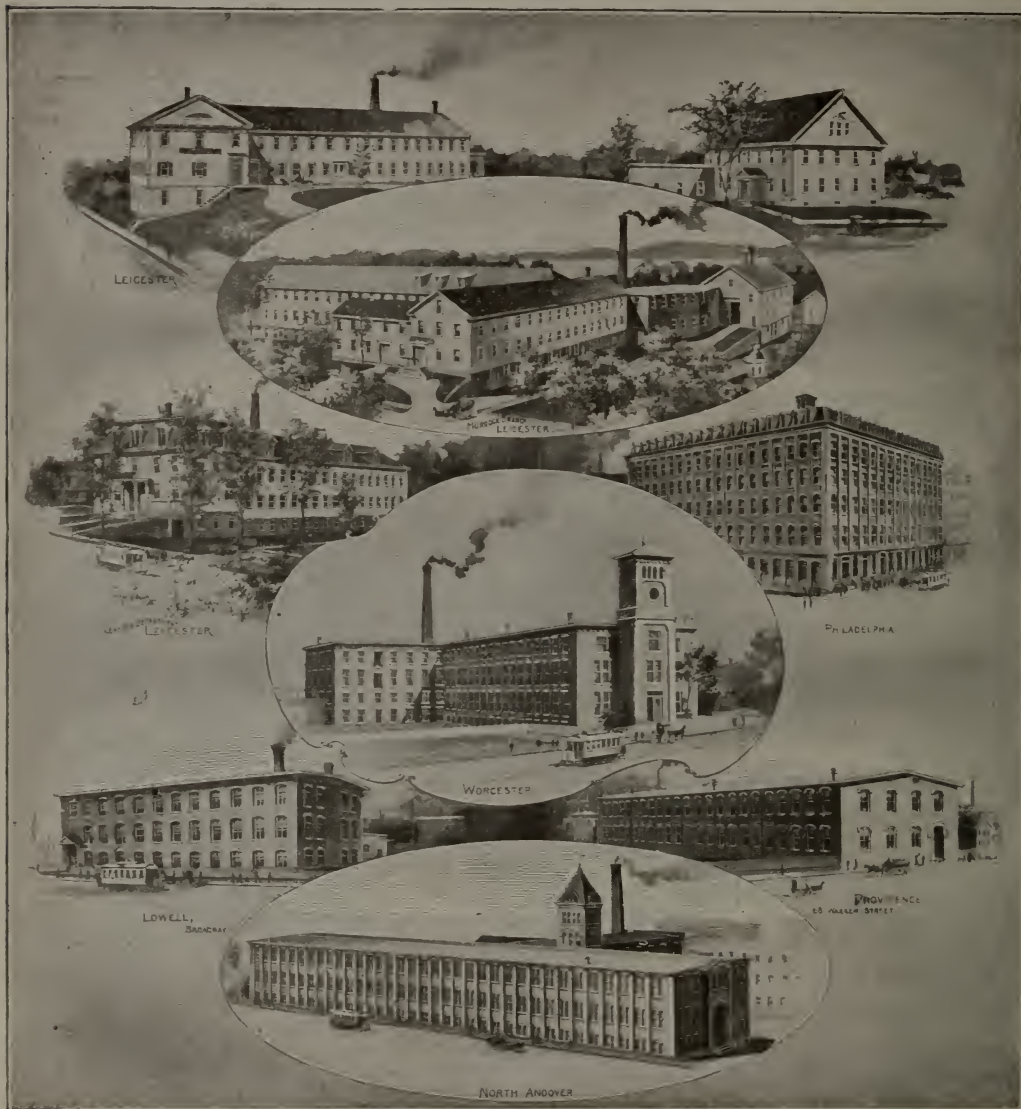


INCORPORATED JUNE 4, 1890.

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FENWICK UMPLEBY, Business Manager.  
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PUBLISHED MONTHLY

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Contributions may be sent to Editor of The Lowell Textile  
Journal, and will receive prompt attention.

## EDITORIAL.

The rage for cheapness is both a curse and a blessing. When it tends to make and sell the same article for less money the result cannot but be of general benefit, but where it tends to reduce the price at the expense of the quality, the result is detrimental not only to the life and safety of the public,

but in its moral effect upon both manufacturer and purchaser.

Cheapness cannot always be expressed in money value, nor in quality, nor in quantity. Thus a foot of land in the heart of our large cities might be cheap at \$1,000, while an acre in the wilderness would be dear at \$1. This difference in price is not due to the quality of the land nor the number of uses that it can be put to, but to the value of the service it can render under special circumstances. On the same principle one man in a certain situation may be cheap at \$5,000 a year and in another dear at \$500. This difference in the value of men is not generally as well understood as it should be. Even in so apparently a simple position as engineer, there are many concerns who could better afford to pay a good man \$10 a day than to keep the one they have even if he worked for nothing.

In this connection, I wish to show the advantages of a thorough technical education. We might

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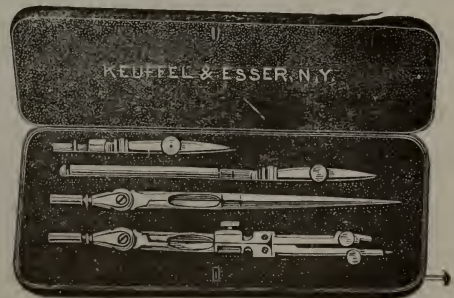
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say that the mechanic arts in nearly all their branches present more opportunities for the really valuable man to rise than any other line of business. The bookkeeper, stenographer, clerk, and warehouse man soon reaches the limit of his advancement past which he cannot go, on the other hand the educated mechanic may rise to foreman, superintendent or even to an inventor and manufacturer who will employ thousands of workmen and wield millions of capital.

The really valuable man—the high-priced man—is always the cheapest man where large interests are at stake. He is the man who will produce the same or better

articles, or the same or better work for less money. In other words he makes high-priced things cheap and low-priced things dear. Taken in its true sense cheapness is the direct contrast to low price, yet there are many men who consider them the same thing, *when they do not understand the circumstances.*

The man who will scorn to buy a \$10 suit of clothes or a \$3 barrel of flour because he knows that the very lowness of price is evidence of expensiveness, will purchase a \$100 boiler, have a \$2 foreman or take a 75-cent advertisement.

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The weaving of plain cloths form the principal part of the cotton trade, and though to the operative accustomed to the weaving of fancy goods the plain loom appears devoid of any remarkable feature, there are certain matters in connection with it that should be thoroughly understood by all students of weaving, as well as those most intimately concerned.

The shedding of the loom is the most important part of all looms. In the plain, or calico loom, this is performed by means of a set of healds, very coarse goods requiring only two healds, while the greatest proportion of plain cloth is woven by means of four healds, as it would be practically impossible, or at least very inconvenient, to operate all the yarn by means of two

healds, as the ends would be too close together. These four healds are coupled, the front two and the back two, and straps or cords from the tops of each pair being connected with a roller placed above the healds. The lower staves of the healds are directly connected by cords to a pair of treadles underneath, placed at right angles to the healds. The treadles act as levers with the fulcrum at one end, and each carries an anti-friction bowl or roller, which is in continuous contact with a leaf of a treadle upon the lower or tappet shaft of the loom.

Some looms are arranged with the stud or fulcrum of the levers at the front of the loom, whilst in other looms it is at the back. When the levers are placed with the ful-

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crum at the front the anti-friction bowl is at the end of the lever, and the healds are connected with the lever at a point between the fulcrum and the bowl, but near the bowl. When the fulcrum is at the back of the loom the treadles or levers are arranged with the bowl between the fulcrum, and point where the healds are connected. It will be seen, therefore, that in order to obtain the same size of shed from these different arrangements larger tappets are required when the fulcrum is at the front of the loom than when it is at the back.

Theoretically the healds are considered to be worked at one point, but in order that all the yarn shall be level on the slay when the sheds are open the back healds must be raised and depressed more than the front healds. In order that this may be effected the leaf of the tappet which operates the treadle for the back heald must be of such a sizes as to produce this larger traverse. The shedding motion is an eccentric one, the healds moving more quickly near the centre of the traverse than at the ends, and a pause or dwell being made to allow the shuttle to cross. This pause is

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of varied duration, according to the width of the loom, narrow looms requiring a pause of 1-3 of a revolution of the crank shaft, whilst broad looms require a pause equal to 1-2 a revolution of crank shaft and sometimes longer. Longer the dwell, however, and shorter is the time for the traverse of the healds, this causing the movement of the healds to be somewhat jerky. Longer the dwell and better is the cover or appearance of the cloth, though this must be attended by consideration of the height of the healds in the loom.

The ends of the warp must be separated from each other on their passing from the back rest to the healds, this being done by means of lease rods, one of them, that furthest from the healds being a thick round one, whilst the other is a thin flat one. The order in which

the ends are divided by these rods is important. A set of healds for a calico is generally of four healds, drawn in one, three, two, four. The healds are set in the loom in such a position that the yarn is depressed at the healds to a point about one inch below an imaginary line from the back rest to the breast beam, so that when the sheds are open, the top yarn will be comparatively slack, and so spread itself out. When inserting the thick back rod, the second and fourth heald from the front of loom should be raised, and for the thin rod, the first and third. By this method the strain of shedding upon the ends is equalized as much as possible.

The setting of the healds low in the loom is customary only in weaving plain cloth, but if the cloth is of a very inferior quality, in which a full appearance or "cover"

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the points of our different machines and compare with others.

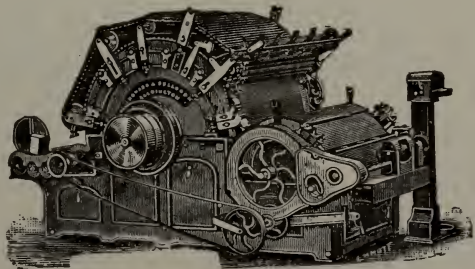
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is not specially required, the healds may be set with the yarn in a line with the back rest and breast beam, in which case the strain upon the warp threads is greatly reduced. Twills, sateens and other heald cloths do not require the healds to be set low. The timing of the shedding in a plain loom has also much to do with the appearance of the cloth, and the best results are

obtained when the healds are level when the cranks are on the top centre. The lease rods should be as far from the healds as may be convenient, this aiding the slackness of the top shed. A slack top shed is generally considered dangerous, as there is a great risk of the shuttle being thrown out when an end breaks in the shed.

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## GRADUATION OF EVENING CLASS.

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The graduating exercises of the third evening class to graduate from the Lowell Textile school were held in the school hall.

The hall was tastefully decorated with palms and flowers and excellent music was furnished by Hibbard's orchestra. The trustees of the school occupied seats upon the stage. The hall was well filled with friends of the graduates and

of the school. The front seats were reserved for the large class of graduates.

The exercises were quite informal. Mr. Alexander G. Cumnock, president of the board of trustees, presided and there were several speakers.

Mr. Cumnock in opening the exercises said that he hoped in a year from this time the graduating ex-

---

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ercises of the school would be held in the new building, that he hoped sometime to see our school a university. He spoke appreciatively of the excellent corps of teachers and the unexcelled plant. He then introduced Mr. James T. Smith, secretary of the board.

Mr. Smith said that his special duties were to look after the legislature, and that he was better able to address a committee than a meeting. In speaking of the development of the cotton industry in this country he said that the purpose of the textile schools was to increase the skill and earning capacity of the operative. It was for this purpose that the Lowell Textile school was established.

The speaker then emphasized

the need of more skilled mechanics in the textile world because of the fact that machinery is continually being improved and in order to be up-to-date in this requirement more and more importance is being given to mechanics in our Textile school.

In closing Mr. Smith said that the Lowell Textile school was destined to be the leading institution of its kind in the world, that the textile schools were in time to lead the classical institutions in importance, that our school had laid the foundation for leadership in industrial lines inasmuch as it considered all processes of textile manufacture and that the trustees would not be satisfied with less than a Textile University.

Mr. Cumnock then introduced

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Mr. Thomas F. Connolly, a man who has risen from the ranks. He gave interesting and instructive remarks intended to set people thinking. He said that he believed in the Textile school, for he believes that a knowledge of textiles is necessary to bring about the best results. He emphasized the value of the school to the working people, saying that it supplied what they had long needed, and that upon its success depended the future supremacy of the state in manufacturing. He said that few opportunities are given to the operative in the mill to learn the technical part of his work and that the textile school is a necessity if we are to have skilled laborers.

Mr. Connolly then gave statistics showing what position the United States occupies in the manufacturing world, spoke appreciatively of the new school to be erected and in closing said that it was only a matter of time when fear of hard

times would be a thing of the past, for trained labor would give control of the markets of the world.

The next speaker was Mr. Edward D. Holden, chairman of the woolen and worsted department.

Mr. Holden said that Lowell would soon have a magnificent Textile school. There was no doubt as to its success. There had been a time when the United States had bought its steel in England. Now it sold steel to all the world. American textile goods were sold all over the world. The mills that were floundering in the country were doing so because of the lack of skilled men in charge of them.

Mr. Holden spoke of the readiness with which manufacturers of costly machinery had responded to the requests for gifts to the school. They had done it because they believed in the future success of the institution. "Young men, you have not commenced yet," he said. "There is a place for every one of

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you, and you need not be discouraged. It isn't the lowest priced men who are the cheapest. Make up your mind that a man generally gets what he is worth. Look out for your place in the business world until you find it."

Edward W. Thomas, chairman of the weaving department, said that as yet very little was known or understood about the cotton industry. In this country, he said, the operative had no opportunity to examine the machine upon which he worked. The school had been organized to meet such a need. Addressing the graduating class he said: "The longer you remain in manufacturing the more you will know about manufacturing and the less you will think you know." In conclusion Mr. Thomas read an article entitled "Labor at its best," emphasizing the need of earnestness in whatever work one undertakes.

Mr. J. L. Chalifoux, the next speaker, emphasized the importance of realizing the seriousness of life, and urged the graduating class to cultivate their enthusiasm and their brains. The country, he said, was destined to lead the world in manufacturing as well as in commerce. Well trained enthusiastic brains alone could accomplish the desired end. With brains and enthusiasm anything was possible.

"Reject the word 'can't' as not good English," he said, "and be determined to persevere in your work with 'I can' for your motto."

Principal W. W. Crosby, whose efficient enthusiastic work and keen interest in the Textile school is universally recognized, was the next speaker. "The country today," he said, "has need of a man who not only works, but who thinks intelligently. The man who does not think has no place in the past, is of no use to the present and is a

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dead man in the future. The record of the world furnishes only a few names which stand out like stars making bright the pages of history. These names are the names of thinkers."

Mr. Crosby then spoke eloquently of the wonderful inventions of the present century. "The reason why we have advanced so far in the realm of thought and invention," he said, "is because the present century has recognized laws of nature and has applied them to our daily need. All these natural forces were here ages ago. It is thought that has materialized them; we have become educated; that is, our thoughts have led us out into new realms of discovery and the laws of nature have been applied to our needs. All past ages have been unable to solve what the present has accomplished. The opportunities of the present are whatever the thinking people make of them."

Mr. Cumnock presented the diplomas to the graduating class as their names were called by Principal Crosby. Before awarding the diplomas, he spoke briefly to the class, advising them in life's journey always to keep on the sunny side of the street, to be fearless before obstacles, to do their best in whatever position they are placed, to keep their tempers well under control and never to be fretful, for a fretful man in spite of great technical knowledge is everywhere out of place. He further urged them always to be ready for emergencies and courageously to persevere to the end.

Diplomas were then presented to the following:

Three years' course cotton spinning:

THOMAS BARNES HITCHCOCK.
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JOHN JAMES CHEETHAM.

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Messrs. Wiley, Burghard, Aspin
wall, Scanlon, Peel, Law, Smith
and Lord are from Lawrence.
Messrs. Whitehead and Buzzell be-
long in Methuen, Mr. Donovan in
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in Medford. The other graduates
are Lowell men.Will the person who was kind
enough to letter Miss S's plates de-
voted his time to more profitable
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Mr. Fred. A. Estes of this firm was with the late Jeremiah Clark, as confidential clerk and salesman from May, 1888, to July, 1898, and manager of the machinery business connected with his estate to Nov. 20, 1900.
 Long Dist. Tel. Office, 7 Hildreth Building, Merrimack St., Lowell, Mass.

GOING ABROAD.

Professor Umpelby intends to visit the Textile schools in Europe during the summer vacation, as he says, he must know what is being done in the old institutions in order to keep abreast of the times, as it is necessary to be posted on these well organized schools and to visit the old country to get hold of any new idea that may not have been adopted here.

There are new fabrics, new styles, new methods continually coming to the front. The students must be kept in touch with the market requirements and must be instructed in the fabrication and structure of all new designs. If the student is not informed of the present requirements his ideas very soon get behind the times. Fashion desires novelty and knowing how to produce these in a practical way so

that they can be put upon the market at a price that is within the reach of all is the art of manufacturing today. To do this, knowledge has to be acquired from the outside, from men who are in constant communication with the most famous leaders of fashion and merchantmen.

Designers of our largest mills have to make regular tours through the large department stores to see what is being done by their competitors and they receive their latest ideas and designs from clippings from London, Paris and Berlin.

"And if," says Professor Umpelby, "it is necessary for those who are in continuous communication with the buyers and sellers to be in touch with the demands of the people, how much more is the need of an instructor to be so?"

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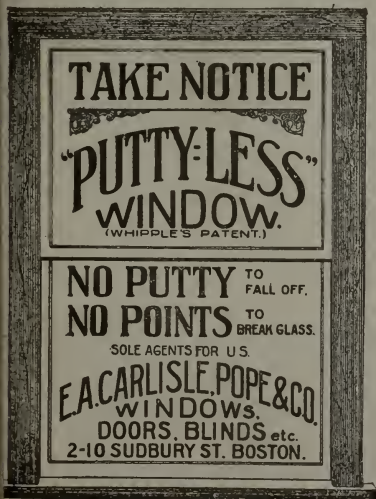
STUDENT LIFE—OUT OF SCHOOL.

The time spent in school is about thirty-five hours a week, so that comparatively little of the students' own time is spent in school. If a student is diligent, however, he will find little spare time to devote to pleasure, although time is found for many enjoyable evenings in the course of the school term.

The student's home work is devoted to studying or writing lectures, making original designs or completing designs given in class,

and various other matters appertaining to school work.

One of the pleasant features of school life is the method of studying adopted by a great many of the textile boys. As the Freshmen become acquainted many friends' hips are formed, and as the term progresses these friends' hips prove a valuable assistance in many ways. During the second and third years at the school the study is much harder than the first year, and it is



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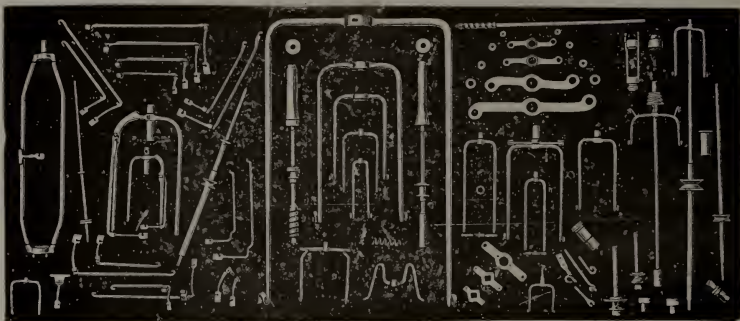
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Flyers, Caps and Tubes.



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Horrocks's Stop Motion Dou-
bling Winding Machine,

during this time that most of the home studying is done. It is not an uncommon sight to see several of the students, early in the evening, with their books under their arms on their way to the house chosen for that night's study. Usually the students divide into parties of from three to eight and each party does its duty together, alternating the place for meeting each night.

The Chemistry and Design courses are, beyond doubt, the two hardest courses, as far as outside work is concerned. Chemistry lectures have to be copied and a great many formulæ have to be worked out, which often causes symptoms of nervous prostration. Designing is not difficult, when

once understood, but the many problems, and various designs, take a great amount of time when done in a proper manner. In addition to this part of designing, original designs of the many varieties of textiles have to be made, and mounted on plates made especially for the purpose, and these, together with "pick outs," take up the balance of time, which is usually given to this branch of study.

Cotton, woolen and worsted, and weaving is better understood when the student is enabled to have practical work on the different machines, although the lectures and notes take a considerable part of home study to be thoroughly understood.

It is a noticeable fact that the

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All Kinds of Hardware and Builders' Supplies.

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Lowell, Mass.

student willing to work and study, finds the term passes quickly and when the examinations are held, the results of his energy are shown in the comparative little plugging which he has to do in preparation, and when the final reports are known it is then easy to find who has been faithful to his work.

As "variety is the spice of life," books are sometimes put away for an evening, and the student proceeds to partake of a little enjoyment. Lowell is unfortunate in not possessing many theatres and there are really only two theatres that may be termed first-class. Occasionally a special performance of a popular play or opera is given at the Opera House and the Lowell Textile school is usually well represented at these performances. Dances, parties and a call on a member of the fair sex are a few ways in which a spare night may

be spent. The boys are popular on account of their general good behavior and instances are extremely rare in which they forget that they are gentlemen and they always act as such.

Very frequently a body of students may be seen walking through the streets on pleasant evenings, and should they meet one of the co-laborers, he is immediately compelled to join the ranks.

On rainy or disagreeable nights the spare time is spent indoors and whist, cribbage and kindred games while away the hours.

The bowling fever has claimed many of the fellows as victims and several match games between the various classes has been the result.

Often a trip is taken to Boston and after visiting the different points of interest in the Hub, and enjoying a "show" at one of Boston's many handsome theatres, the

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return trip to Lowell is made usually on the last train.

Whatever the form of entertainment may be enjoyed by the student, it is always one that is free from vulgarity.

The students of the Lowell Textile school are hard workers, attentive to their duties and are always willing to help one of their number who may be for several reasons, backward in his studies. They are a jolly class of fellows taking advantage of every opportunity to play a joke on any one of their number and expect to have the joke returned with interest. "Cribbing," or taking advantage of each other is practically unknown and a "shirker" is severely let alone. In school or out they endeavor to uphold the name of the school, and their actions upon the street has been the subject of an extremely pleasant compliment (unsolicited) from one of Lowell's daily papers.

Whatever differences there may be between themselves or with the various professors, is quickly adjusted, and the old adage "live and let live" seems to be one of the principles of the students.

Clubs or associations are virtually unknown, owing to the adverse circumstances caused by the inadequate and crowded quarters of the present school, but within a year, in which time the new school will undoubtedly be completed, this pleasant feature of school life will be enjoyed by those wishing to partake.

When the course has been completed and the student has received his diploma or certificate, he should be able to face the world with the feeling that the time spent at the Lowell Textile school has not been wasted, but that it has fitted him to overcome whatever difficulties may be presented and that he leaves the school a better and wiser man.

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ECHOES.

Poor Cr-g, fifteen minutes for luncheon between "exams."

F-st-er prefers "Esther" to Edith.

"Shirt waist parties" are enjoyed by some people.

The school membership has been largely increased within the past few days. Two men may now be seen instead of one within the doorway of the new school. Can it be the "Two Heads?"

Did you read the "glowing" account in the Boston papers of Prof. "Dick" Olney's stately, entrance into the court room during the Eastman trial?

"Rip" has resurrected some of his 1406 B. C. stories.

"She dresses in black and rides a wheel."

King Rameses recovered his long lost pipe a few days ago. Since then he has had several pipe dreams.

Stratt has practised lettering lately and the result of his labors may be seen on the plates of certain frehsmen.

Shirt waists are fashionable during "exams."

It is a long distance from the car house to Belvidere on a wet night.

Time worketh wonders. A year "Spider" shared the hearty laugh of the Highlands, but today "Slippery" is the choosen one.

Take an earlier car next time, Jack.

Red is fashionable this season, H-nl-y, but we would like to see a new tie for a change.

"Seek and ye shall find" does apply to Str-tt-on. He has been missing for two weeks.

B-ll-ck's "birthday party" was a great success. Several of the guests enjoyed a trolley ride after the event. Why?

"Moore" was hungry during the cloth construction "exam." He was looking for a dark brown taste.

Why does she whistle and wait in front of a certain house in West Sixth street? It must be for either the "Professor" or Willie. Which?

Gates street is proving attractive to both first and second year men, and theatre parties are the result.

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Lowell Textile Journal



WM. W. CROSBY, S. B., M. E.

Principal of the Lowell Textile School and Professor of Mechanical Engineering.

EDUCATION AND INDUSTRY.

By WM. W. CROSBY.

Through all the ages, man, the intended master of the earth, has been striving always to make his mastery more complete, and to bring under his control not merely the animal world but physical forces as well. When he discovered that only "by the sweat of his brow" should he enjoy the best privileges of existence, he found that material things could be made to contribute to his happiness in the highest degree; but the subtle forces by which nature controls its manifestations were for a very long time beyond his grasp, and even today when we seem to have so many useful adaptations of these forces, we have no way of knowing but that the undiscovered laws are many times greater and more important than all that is now within our grasp. But it is worthy of note that in the beginning, progress was particularly slow; from generation to generation there was but small advance, indeed, if the sons learned to do what their fathers did, and to do it well, they had accomplished much. When we take into consideration that there were many failures and few

advances, it is not to be wondered at that the general progress was so slow. There were occasional glimpses of many of the laws that today are well known but so brief and limited were they, that for many centuries they failed to help the world.

With the perfection of written language and the transmission of documents, came a marked step forward, but too many times those who possessed the faculty to preserve their thoughts in writing were prone to lend themselves to the discussion of metaphysical topics and not to the promotion of science. Nor was it recognized that by a mastery of the laws of nature would there be any material advance in the general welfare of the world; questions relating to religion, politics, and letters were ably treated, and at great length. When nations began to go to war against one another, it was most strongly realized that mechanical appliances could give greatest advantage to the one side over the other, and the demand was accordingly large, but so few were the



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means for accomplishment that only the crudest results were attained.

Those few pioneers who left in tangible form the results of their investigations clearly stated, allowed their successors to start very nearly where they had left off. The steps were slow but they were at last pointed in the right direction.

At the opening of the 19th century there was a considerable collection of writings which had been made with such care and completeness as to allow the savants of that era to bring out many things which were all but startling in their novelty.

With such a condition of affairs

it was not hard to make apparently great strides, as for instance, where a machine that would spin many strands of yarn at the same time replaced the hand spinner who could produce but one, but the idea alone, or in its first crude form, while a great advance was not by any means all there was to attain. To bring anything to perfection requires an effort in the expenditure of time and strength, whose proportions multiply many times faster than does the perfection attained.

It is not enough to rest upon what has been accomplished; each detail of the work must be brought as near perfection as lies within our power, and the standard of excellence is always increasing.

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All said and done, the world of today demands men of action, men who can think and do. There are many ways in which this end may be attained, just as there are many roads which lead to Rome; some are longer, some shorter, but their end is one.

In bygone days, and not so far back either, the man who had the ability to read and write was rare;

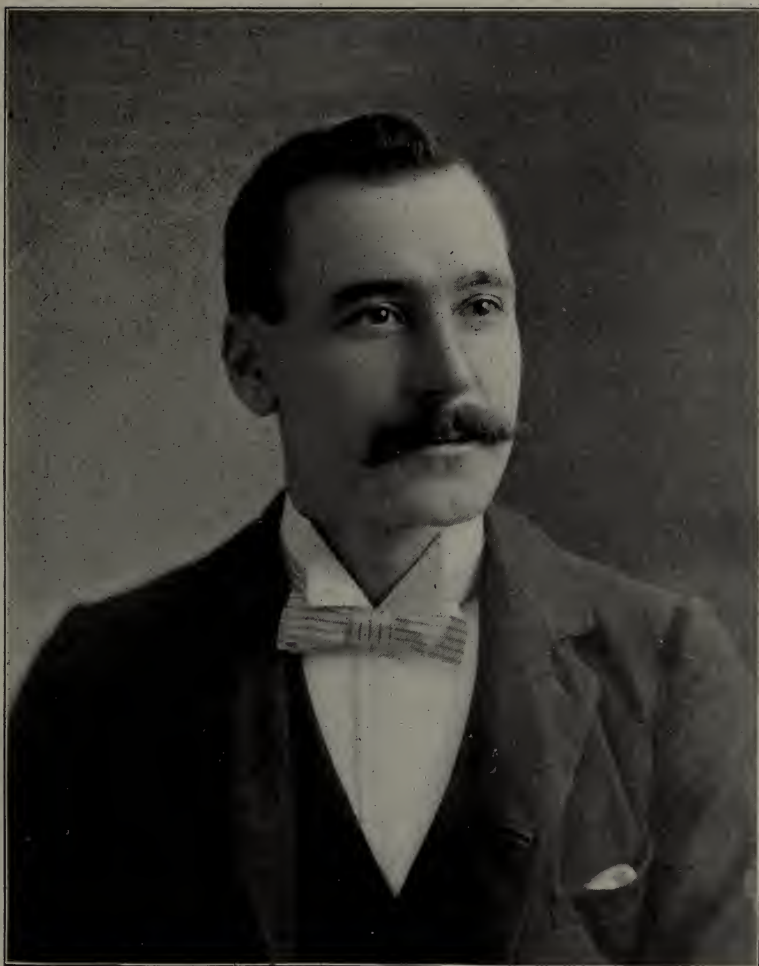
the language in which this article is written is not so very old, and it is probable that no written language has been in existence but a few thousands of years. It is not strange then, that great emphasis should have been placed on the attainment of letters. Undoubtedly this was one of the greatest steps in the advance of the world, but unless there were ideas behind

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the words, they soon became wearisome if they did nothing but wander through intangible space. There must be a definiteness, a concreteness, the nucleus, from which the discussion may start and about which it may build.

Certain physicists have been heard to complain that there was always a scarcity of subjects to which they might apply their formulæ. What a pity! The world around is waiting and eager for the deductions of science that it may use them in everyday life, and not always to supply a necessity, but often to please or amuse. No doubt it may in the end help to

the general advancement to develop endless theories, the results of which may forthwith be carefully laid up on the shelf and catalogued for future use, as a wood carver might take each odd block and fashion it ever so artistically, at his own caprice; when there came a demand, what would be his chances to fill the order where some particular stock and size were called for, to say nothing of the treatment?

The professional engineer of to-day has been greatly assisted by the deductions of the mathematician, but there is the greatest need for systematic treatment of the

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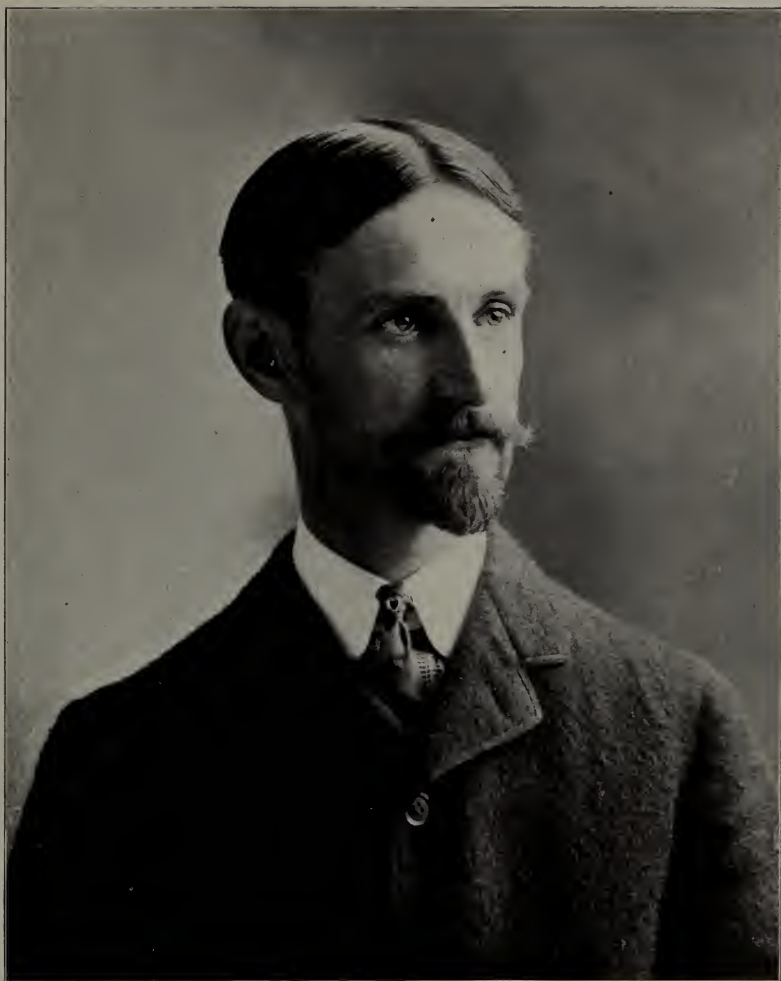
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many problems that are constantly before the manufacturer.

It must not fail to be noted that today we recognize that certain studies have an ultimate bearing upon many useful problems, where at first thought the connection may seem remote. In astronomy, for instance, although a knowledge of the heavens greatly facilitates the work of the mariner, he might devise other ways to locate his ship; but through the agency of astronomy we have a means for providing a reliable unit of measurement, the light wave, that will enable us to transmit to posterity in reliable terms the attainments of today. Thus, though astronomy does not seem to have much to do with our great industrial development, yet we see how it may serve as a means for a more rapid advance in days to come.

Above all things else in training

a boy, we want to teach him to concentrate his mind upon a given subject until the problem be solved. It has long been recognized that "All work and no play makes Jack a dull boy," and at the same time it has been fruitless to sugarcoat all that was given him, for in such a case the important parts of the truth were lost. The average boy is full of activity, and wants to do something where the results are tangible.

If he is given such work, there is some incentive other than a threat to keep him at his task that he may see it accomplished. In this way his mind is held to the problem at greater length and with greater keenness, everything conducing to bring out his best efforts, so that whether or not the result be in a tangible form from the utilitarian standpoint, we have gone much further than we could otherwise in

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the general process of education. The laboratory method of teaching takes account of the foregoing but goes further, for by it we are enabled to make definite advance along the general lines of scientific development. Up to the middle of the 19th century, whatever work had been done in Science had been accomplished chiefly through the lecture room demonstration of the various experiments; the student had little, if any chance to handle the apparatus for himself. William Barton Rogers, the first President of the Massachusetts Institute of Technology, was keen to grasp the situation, and by strenuous and persistent effort brought to bear the greatest agency for the development of applied science the world has ever known. He insisted that the student should be placed at the bench, where each experiment must be performed with precision and accuracy, and that this work should go along with the lecture and the outside study.

There was then offered a facility to compare theory and practice. If the computation gave one result and the demonstration another, it was evident that one or both must be wrong, and each case of this sort formed the basis of such research as would prove the truth.

Until the results of such training as this could be brought to bear upon the affairs of every day life, in sufficient strength to be felt, there could not fail to be great discrepancies between the computations of the imperfectly trained man who had to depend upon the old time system, and the results as obtained in practice. Manifestly a manufacturer would be forced to depend upon what could be seen, and handled, and measured directly, rather than to try to use the vagaries which could lead to no definite results. It was usual then, for the so-called theorist to be shown but little respect and to find almost no place in these great industries, as they grew. For a long time the

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manufacturer succeeded well by giving careful attention to the various departments of his work, and while the margin between raw stock and manufactured goods was large, he succeeded.

There have been in every age, a few master minds who must have succeeded under the most adverse of conditions, and these minds kept commerce and industry alive. To-day in the world around we find that this sort of development has apparently reached its limit, and that if these industries are to succeed, they must draw upon all the theory that the world has.

With the universal acceptance of the laboratory method, men are developed who can combine theory and practice properly, and these are the men who are demanded. It is a most happy combination then, that we can find in such a training the possibilities of developing a mind in the highest degree from an intellectual standpoint and at the same time to have it avail so

much in affairs which count for the advancement of the world.

The textile industry, although its results are of vital importance to mankind, has been one of the last to find specific application of these modern methods of development. Hitherto it has been counted sufficient that a man should train his mind along general lines, and trust to his own keenness to acquire the details which must be his main stay in carrying forward and helping to advance this great division of the world's greatest industries, while other lines have had the facility of the definite and particular training that is so necessary to their best results.

The Lowell Textile School is a direct outcome of this pressing demand and in the few years of its existence has proved its worth. The incorporators are representatives of the great manufacturing industries which are located in the Merrimack Valley, where there is a greater diversity in both raw

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stock and product, than in any other district of its size in the world. The great water power furnished by the Merrimack River was responsible for the location of this industry in the beginning. Not alone do we find the manufacturing of the various textiles through this district, but also some of the best equipped machine shops in the world, which produce the machinery to clean the fibre, spin the yarn, make the fabric and finish it for the market. The school has the very best machinery in its various laboratories, where not merely experimental work may be performed but operations can be conducted on a commercial scale.

It is the intention of the faculty to introduce whatever there may be in science that can in any way aid this work which means so much to the general prosperity of the community.

The support that the school has received in its comparatively short existence has been marvelous. The State of Massachusetts and the City of Lowell have been quick to see and appreciate the situation, and their timely support

has given the school a most excellent equipment. Within the last year the Commonwealth has appropriated \$70,000 to provide a new and permanent home and Frederick Fanning Ayer, Esq., of New York City, and a former resident of Lowell, has given a like sum of \$70,000 to aid in erecting the first of the group of buildings which will be necessitated in the near future. This first building, which is now in process of erection, will be named Southwick Hall in honor of Mr. Ayer's grandfather, one of the pioneers of the textile industry. The site is on the shore of the Merrimack River just below the famous Pawtucket Falls, and the lot is $3\frac{1}{2}$ acres in extent. It is not far from the centre of the city. When completed the Lowell Textile School will have a location and equipment which will leave little to be desired.

"Rocky" has been seen at the perch.

Joe, do the fishes at Lakeview like keys and pocket books as a steady diet?

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Views of the Merrimack River Near the Textile School.

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Journal, and will receive prompt attention.

EDITORIAL.

The educated mechanic is the coming man in the mechanical field because he is educated. His education enables him to do things better and quicker than his uneducated brother.

Education does not necessarily imply a college course, as a man who has gone through one may be

much less educated for his business than the man who has only had the advantage of a few winters in the common school.

True education consists in acquiring knowledge in respect to business, both practical and theoretical. It does not follow that the mind must remember a vast amount of detail, as any attempt at this will result in the forgetting of many important items.

If the mind can only remember just so much, how then can a person reach more than a certain stage in education? The reply is, that it is accomplished by the manner of acquiring and retaining information. It should be understood that a large share of an educated mechanic's information consists of the data in his note book and his ability to find what he wants in published works.

These form a part of a supplementary brain, as it were, where he can store any amount of information for future use.

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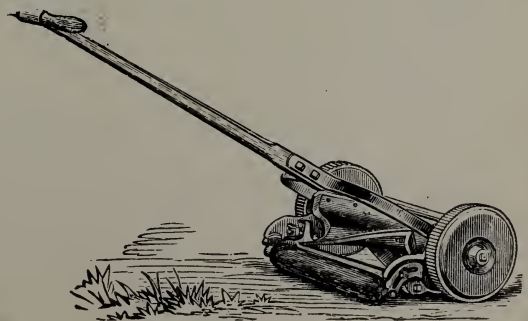
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The principal requisite to continued acquirement of knowledge consists in making the proper separation between the matter to be kept in these two reservoirs or warehouses.

In general, it may be said that the division should be made along the line between principles, and the detailed results of principles, the former in the mind, the latter in notes. To illustrate, we may say that a man who has designed a successful machine has in his mind the principles on which it was designed, but he does not know nor is it advisable for him to try and remember each detail of size. These are recorded in his drawings, which in this case constitute his notes, and to which he can quickly refer. Another illustration of what should and what should

not be retained in the mind may be afforded in the case of calculating speeds of machinery. When power is transmitted from a main line through a counter line to a machine, it is not policy for the searcher after knowledge to find the speed of them all and the diameters of the pulleys and attempt to remember them so they will be ready when the next case like it comes up. This is not education but a mere feat of useless memory. It would take a little longer, but much easier to remember and be of very much more value to learn how this result is arrived at, then this information would be of service in any case where speed of machinery is concerned while the useless feat of memory would be of service only in an identical case.

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should be remembered rather than be written down and these constitute mostly those relating to practical experience whose principles are not understood or dependent upon arbitrary action of others. Illustrations of these are peculiar or unexpected results, the quality of oil that is best in certain places or the average steam pressure carried by engineers.

OFF FOR EUROPE.

Professor Fenwick Umpleby will sail for Europe on the 3rd of July, 1901.

Principal Wm. W. Crosby will sail for Europe on or about the 10th of July. He will visit the leading Technical Institutions of Germany, France, Switzerland, England and Scotland.

Why don't the other professors visit the European schools, surely

there is something to be learned. We may be considered *smart* in many things, but the old country can teach us much more. A visit to the cotton mills in Lancashire would astonish many who consider themselves conversant with all the ins and outs of the cotton industry.

A few days spent among the workingmen of Bradford, Keighly and Huddersfield, would be very interesting. These three towns are famous for their worsted machinery, also worsted yarns and fabrics, and the time given to this section of Yorkshire would result in receiving much very valuable information.

Why does Y-ngm-n want to stay in Lowell all summer?

"Moore" and "Rip" established new bowling "records" for the school recently, 25 and 28 respectively.

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TEXTILE GRADUATION EXERCISES.

PRINCIPAL CROSBY'S ABLE ADDRESS TO THE DEPARTING CLASS—MEDALS AWARDED—
INTERESTING SPEECHES BY TRUSTEES AND THESES BY STUDENTS.

Graduation day at Lowell Textile school has become one of the enjoyable events of the season each year, and the final exercises by and in honor of the class of 1901, which were held June 6, quite surpassed similar events in the last few years. The hall was well filled and at 2.30 o'clock, after a selection by the American orchestra,

Mr. H. T. Ewer read a thesis on the subject, "A Study of the Production of Turkey Red." Other thesis read in connection with the exercises were: "Variation of Fly Frame tension Due to the Radial Link Action," W. N. Marinel; "A New Device for Actuating an Oscillating Reed," J. A. Currier; and "Effect of Ratch on Breaking

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The principal of the school, Mr. William W. Crosby, also delivered an address.

Professor Crosby's theme was "Science in Every Day Life." After referring to the discoveries and inventions of the past century, especially the developments connected with electricity, Professor Crosby said:

There never was a time in the world's history when advancement along all lines of manufacture had greater impetus than now. We have striking illustrations of the relations between manufacturing countries where trained skill is employed and those where it is lacking. We have seen in our own country a most phenomenal growth in the iron and steel trade. Why have we been able to build bridges

in a shorter time and at a less cost, to be erected in a far-away continent, where all the mechanical appliances to be used in their erection might be had only by taking them there, where men used to our climate have worked under tropical suns and under the most adverse conditions and then have received the well merited applause of the whole world? Why have we been enabled to build locomotives, adapting them to the particular conditions of countries all over the earth and to place our orders in competition with the world? Why have we made tons upon tons of water pipe to send to Australia? Why are there many representatives from the faraway "Yankee land of the east" in our country to buy looms? Again, let me ask, why have we been able to do these things within the last decade and

STUDY

the points of our different machines and compare with others.

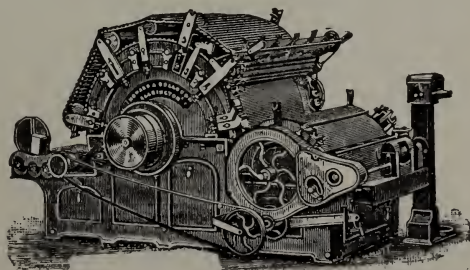
UNDERSTAND

the merits and you will be convinced beyond a doubt of their superiority.

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not before? Surely not because the iron ore was not in the mountains, nor for the lack of coal, nor yet for the lack of capital. There can be but one answer. Because we did not know how.

From time immemorial the man who mastered letters has been universally looked up to as the possessor of something occult, that he is far above those who had not his attainments. Those professions that depended upon such a knowledge were accordingly placed on a high pedestal long ago, while he who shod your horse and mended the tire on your wagon was looked upon as one possessing a trade which was to be attained only by the repetition of these self-same operations. It was not often that the apprentice ever exceeded his master in skill, and if he did it was in some trifling detail if he depended upon his hands alone. When once it was realized that the

advancement in any line was attained not by a great manual dexterity, but by an application of the mind through the hand, then we had the inception of scientific schools.

It always gives me great satisfaction to ascribe the high position of our own country in the affairs of the world along the lines just spoken of to the training that we have had through these scientific schools. There is one school which dates back to about the first quarter of the century, but those that are now the largest and most important date back to within the last half century—far enough back that the graduates may take important positions in the concerns which are so far in the lead of our great prosperity.

The growth that is of the most importance is the one whose roots have sunk deep enough to supply, in the driest time the trunk and

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branches with the needed nourishment, where the minimum flow must never be less than such an amount as will satisfy the demands of the whole. Such a growth is of necessity slow, and usually the slower the growth, the firmer will be the substance, well fitted to withstand the storms and ravages of time.

The centuries have been accumulating funds of knowledge, which are now in our hands; and we are in a position to advance many times faster than ever before.

Suppose the carpenter to be building for you a house; nowadays he selects for his stock the frames, boards planed and finished, mouldings, floorings, doors, and windows, where once he was fortunate to obtain the lumber roughly squared and dry enough to work. What is the result? Does the carpenter know less or are these various specialists mere machines

or parts of their machines? Does it throw out of employment the high-priced man who can perform all these operations? No, rather it opens up countless other positions in allied industries, giving in almost every case employment to a far greater number of men, and with the added advantage that the product may be within the reach of a vastly larger number of people, whose homes may be beautified, or made comfortable, or both. Who a hundred years ago ever heard of a motorman? Or what would our forefathers understand by such terms as conductor, lineman, stoker, brakeman, bacteriologist, analyst, or, indeed, a score of others?

Each specialization brings a new field with its many positions into view and adds to, rather than cuts down, the number of available opportunities where men may work. To be sure, many improved machines do away with an amount of

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manual labor, but require more and better skilled labor at the head of of the line. The law of the survival of the fittest must ever dominate.

In seeking to surpass previous attainments, man long ago had provided well for the necessities of life, and not much was lacking to make him comfortable; but he has not been satisfied with this; he has launched out in all directions; he must have fruit from the tropics; spices from the East; tea, coffee, and, in fine, everything to be had in the world, and will exchange for them his own products. He must have really an efficient means for communication that he may travel and visit wherever he may choose. He has not been satisfied to clothe himself with that which makes his body merely comfortable; he seeks to adorn it; the coverings of the walls and floors of his houses have been treated similarly.

There is no more striking mark

of the advance of civilization than the degree of beauty in their fabrics. There is no greater division among the industries of the world, where there has been a greater lack of application of well-trained minds, than in producing the countless varieties of fabrics with which we clothe ourselves and beautify our homes. To be sure, it is not so very long a time since there was any but the crudest form of hand machine to clean the fibre, make the yarn, or weave the cloth; and until the cloth itself could be constructed there was obviously no chance to even attempt to beautify.

The tapestries of the olden time and the fabrics with their intricate designs were made by the slowest process of hand work and were therefore so costly as to be beyond the reach of any but the rich.

When power machinery was introduced, the quantity of the output was increased and a uniformity of

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product secured. This was the first great step forward, but in a work on cotton manufacture published no longer ago than 1836, I read that "the plain loom is running well, and great hopes are entertained that there will soon be a power loom for weaving fancy goods." There have been great difficulties for the manufacturer to overcome, and there has accordingly been the greatest tendency for him to continue with a given line of goods, as long as a market could be found, changing only when necessary to keep up the trade.

The apprentice system was good, and it turned out men who managed these enterprises in a masterly way, but who shall say but that it might have been better? It is not in the power of everyone to impart knowledge, and the young man who depends entirely upon his own

quickness of perception and what he may acquire by chance from others is most surely handicapped in the race with the elements as compared with him whose mind is directed by those selected for their capability and skill in whatever particular line it may be.

I find that there is not a lack of properly developed artistic ability to blend form and color in perfect harmony; this has been in the world for centuries. It is the mechanical means to reproduce these things that is lacking. Who can estimate the uplifting influence of the numerous photographic, lithographic and other printing processes in scattering broadcast, and bringing within the reach of the poorest, the best art the world has known? While this may have its effect upon civilization, people are not compelled to look at such things as they are their clothes,

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carpets, hangings, and the like. Here we meet the serious question of mechanical devices to further our ends.

Wonderful results have been obtained, but the field is wide for conquest. Even now many processes are crude, but the means for study and investigation are increasing fast.

The establishment of this school has marked the opening of a new era in the textile business and you who have had the advantage of its training are now to go out into the world to use the knowledge you have acquired here. You must remember that even today many men look askance at what they term "book-learning" and if they detect in you, the graduates of this school, evidences of faltering or of failure, they will be harsh in their judgments of the whole plan; for such people are seldom charitable and rarely would investigate at

first hand by visiting the headquarters.

I have confidence to feel that you will represent the school well, and I am sure that you will be heard from for your achievements.

But you must remember that the large proportion of what has been accomplished in the world, has not been done at single lucky strokes.

Large nuggets of gold have been found at a single turn of the spade, but the greatest and most telling gains are made only by persistent digging, finding in each shovelful a small amount; yet by taking pains and allowing nothing of value to escape, the final result is large.

You must be always on your guard, day and night, to add to your store of knowledge, and to try ever to learn to apply that knowledge to some useful and practical end. Be painstaking and conscientious in every detail of your work, whether it is directly in sight

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of some one with whom you think it may count or not; it will count later if it does not sooner, and if well done, cannot fail to spell for you in well rounded letters the word, Success.

After Mr. Crosby's address, Mr. A. G. Cumnock introduced Mr. George Otis Draper, who, acting in behalf of the New England Cotton Manufacturers' society, presented a medal to Mr. B. M. I. Parker. He said that in presenting the medal the society had given Mr. Parker the preference because he had studied and excelled in the cotton course, but if he had not stood high in his class the medal would not have been awarded him.

"I suppose you realize," he said "that textile education in this country is a modern affair. In Germany it has long been a feature, while Great Britain is at a standstill in this branch because of the

rapid strides made on the continent especially by Germany. We are also making rapid strides in this education in this country, yet we still import many fabrics we might just as well make ourselves.

"You are going out into the world and you will find many who think the only way to get a textile education is by experience. But you have had advantages these men never had. You have had the use of machinery to give you practice with the theory, and if you do not make use of this knowledge it is your own fault.

Mr. J. W. C. Pickering, in representing the board of trustees, spoke for ten minutes most interestingly and encouragingly of the opportunities that present themselves to the young man who is ready to grasp them. He compared the old days of manufacturing with the present. "Formerly," he said

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Europe thought we were nothing but an agricultural people, we could not make stock, we could not offer any competition in the textile world. But the nations have come to see that we will take a leading place in this textile industry and command the attention of the world.

"You young men are going out in the world of business and you must compete with each other. You are going to get positions and apply the learning you have acquired, and you will find you will have to apply all your knowledge in order to succeed. I trust I may meet you in the future as the heads of great manufacturing establishments."

Mr. A. G. Cumnock in presenting the diplomas had a few words

of council to give. "Be of good courage," he said, "Don't get discouraged. Don't become pessimistic. There's a great field for you. If opportunities do not offer themselves in the manufacturing world, there are opportunities in the new countries, and in Spain, Mexico, China and other places. We need educated merchants to push our goods just as much as we need manufacturers to make them"

Mr. Cumnock then presented diplomas to these graduates who have completed the regular course.

Buchan, Donald C., II, Andover, Mass.; Currier, John A., II, Andover Depot, Mass.; Ewer, N. T., Ph. B., IV., Lowell, Mass.; Foster, C. E., II, Lowell, Mass.; Kingsbury, P. F., IV, Lowell, Mass.; Marinell,

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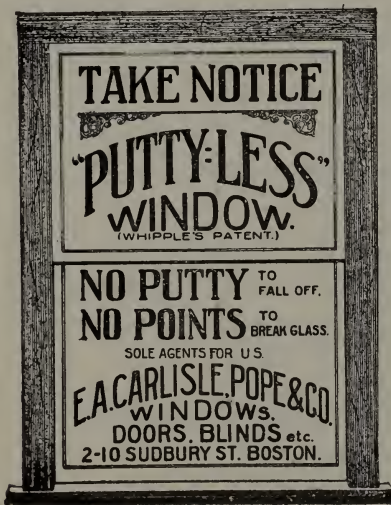
AMERICAN MASON SAFETY TREAD CO.

Crompton looms. Our first week was spent in becoming acquainted with the loom and the class of goods being manufactured. After a few minor mishaps, consisting principally of pick outs, we find ourselves making a noticeable improvement and feel assured that by the time our stay here is ended we will be materially improved in both weaving and cloth construction. The hardest thing that we had to learn was the art of "pick-ing out," which is done with the aid of a comb

Our familiarity with designing and weaving, which we acquired at

the school, enabled us, at the end of the first week, to have work which would have taken fully three months, had we come here without any such preparation. This was the information given us by Mr. Wilkinson, the boss weaver and overseer, who thoroughly believes that any one intending to take part in textile manufacturing in any or all of its branches, should first have a textile education similar to that given at the school.

There are three young men in the mill who will undoubtedly attend the Lowell Textile school in the fall and we hope that more



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will be able to join us by that time.

Wishing you a pleasant vacation, and trusting that the design students will be able to reap a few of the benefits of your foreign tour, we remain,

Yours very truly,

THE TWO HEADS.

RESOLUTIONS.

At the meeting of the Alumni the following resolutions were adopted — Whereas, it has seemed just in the eyes of an allwise Providence to abstract from our honored brother C. J. B. — his much beloved tin wheel, we, realizing the extent of his bereavement, hereby proffer our heartfelt sympathy and beg to assure him that had the same been reported to this august body, the price of a return ticket would have been forwarded without delay.

NIT, NIXEY.

Committee on Resolutions.

We beg to thankfully acknowledge the following exchanges:

Aggie Life, Amherst, Mass.
 High School Advocate, Needham, Mass.
 The High School Folio, Flushing, N. Y.
 Latin and High School Review, Cambridge, Mass.
 The Cue, Albany, N. Y.
 High School Bulletin, Lawrence, Mass.
 Gates Index, Neligh, Nebraska.
 Arms Student, Sherburne Falls, Mass.
 High School Gleaner, Pawtucket R. I.
 Res Academical, Wilkes-Barre, Pa.
 The Sagamore, Brookline, Mass.
 The Review, Lowell, Mass.
 High School Panorama, Binghamton, N.Y.
 The X-Ray, West Bay City, Mich.
 English High School Recorder, Lynn, Mass.
 The Thistle, Leominster, Mass.
 High School Sentiment, Parsons, Kan.
 Advocate, Saugus, Mass.
 The Normal Pennant, San Jose, Cal.
 The Chesbrough Chronicle, North Chili, N. Y.
 Phillip's High School Review, Watertown, Mass.
 The Radiator, Somerville, Mass.
 The High School Journal, Wilkes Barre, Pa.
 Latin School Register, Boston, Mass.
 The Murdoch, Winchindon, Mass.

Lothrop Cunningham
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A review of our past year's work shows a most pleasing increase in our business, both in quality and quantity. All our old customers have found us in our New Studio and many new ones have joined them in hearty appreciation of our efforts to give them the very best in photography.

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*BUSINESS MEETING OF
THE L. T. S. A. A.*

At the business meeting of the Lowell Textile School Alumni Association, the following officers were elected for the ensuing year:

Pres., Wm. R. Moorehouse, '01; Vice Pres., H. A. Bodwell, '00; Sec.-Treas., A. Stewart, '00; Directors, D. C. Buchan, '01; P. F. Kingsbury, '01.

A letter of resignation from C. J. Brickett, late Sec.-Treas., was read and accepted. A vote of thanks was extended to him for his very efficient work during the last year.

Will T-ll-r please write a book entitled "Three Men in a Carriage" instead of his long delayed book on "Girls?"

"Worthy Chief" will now be known as "the Duke." His acquaintance with the "Duchess of Marlborough" has earned him that title. So "Rocky" says.

H-rr-s quick wit in donning Joe's collar gave him a chance to enjoy a dance.

"Bob" and Clarence are firm believers in "Father John's."

"Keep away from the ghost, "Billy."

A new comedy by Freshies, "Dress suit cases after dark."

$$1 + 1 = 1.$$

She was one, and I was one,
Strolling o'er the heather;
Yet before the year was done,
We were one together.

Love's a queer arithmetician
In the rule of his addition;
He lays down the proposition,
One and one make one.

She and I, alas! are two,
Since, unwisely mated;
Having nothing else to do,
We are separated.

Now, 'twould seem that by this action
Each was made a simple fraction;
Yet 'tis held in Love's subtraction,
One from one leaves two.

THE CRYSTAL CAFE . . .

Dinner, 11.30 till 3 o'clock. Oysters and Shell Fish.
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THE ALUMNI BANQUET.

The second annual banquet of the Lowell Textile School Alumni Association was held at the St. Charles Hotel, Thursday, June 6th.

Previous to the dinner the members met in the parlor and spent a most enjoyable hour listening to vocal and instrumental selections by various members of the Alumni.

Prof. Umpleby set the ball rolling by thumping the box to the tune of "We won't go home until morning."

Prof. Nelson followed with a song, which was appropriate and well rendered.

Prof. Barker then rendered several very pleasing selections which so affected Prof. Olney that he immediately volunteered to sing that heart rending ballad entitled "He's up with the Angels now."

This was followed by various

popular airs in which all participated.

Principal Wm. Crosby, who, owing to ill health was unable to remain to the dinner, spoke a few words of counsel and encouragement advising the graduates to strictly follow in the path of duty, and to uphold the honor of their Alma Mater.

Immediately afterwards the company adjourned to the dining room where justice was done to the excellent menu prepared for the occasion.

After the coffee was served and the cigars lighted President Smith, Class '00, who was toastmaster for the occasion, called upon Prof. Barker to reply to the toast of "The Lowell Textile School." During the course of his remarks Prof. Barker exhorted the Alumni to keep the bond of unity and to work in harmony for the best interests of

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the Association and for the success of the School. In closing he gave as a watchword, that quotation from Alex. Dumas "One for All and All for One."

Following this came words of advice from the rest of the Faculty and stories from the students.

The following members were present viz:—Principal Wm. W. Crosby, Profs. Umpleby, Barker, Humphrey, Nelson; J. A. Olney, Dowling, A. Stewart, I. W. Barr, H. A. Bodwell, B. M. Parker, J. A. Currier, S. E. Smith, A. J. Pradel, G. F. Lamson, W. R. Moorhouse, W. Marinel, D. Buckhan and A. Weber.

ALUMNI NOTES.

Who was George Washington?

We missed your horse laugh, Chauncey.

According to report "Dick" is enamoured of the table girl.

Does C. J. B.— intend to compete for the America's Cup?

Moore did not like the looks of the punch; but oh! my.

What made Weber so sleepy?

Willie, we thought you had sworn off.

Marinel hung his hat and coat on the floor and went to bed with his socks on.

"Cheese it," Currier.

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And I give careful, painstaking attention to it. I give special attention to the repairing of fine watches—the kind of Watches that need extra careful adjustment. I try to have my work give such satisfaction as will win the confidence of all who leave their Watch repairing in my hands. I want you to feel that when you leave your Watch with me for repairs the work will be done to the best of my ability and in a competent manner. It is my ambition to add to the reputation I think I have in a small measure already established, of doing honest, thorough Watch repairing.

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Note the address,

Lowell Textile Journal

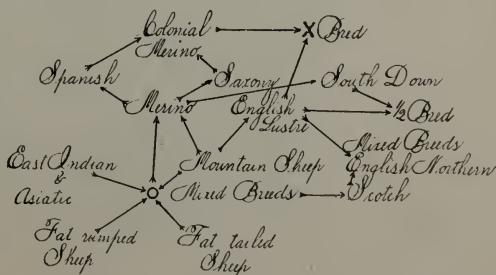
WORSTED SPINNING.

I—WOOL.

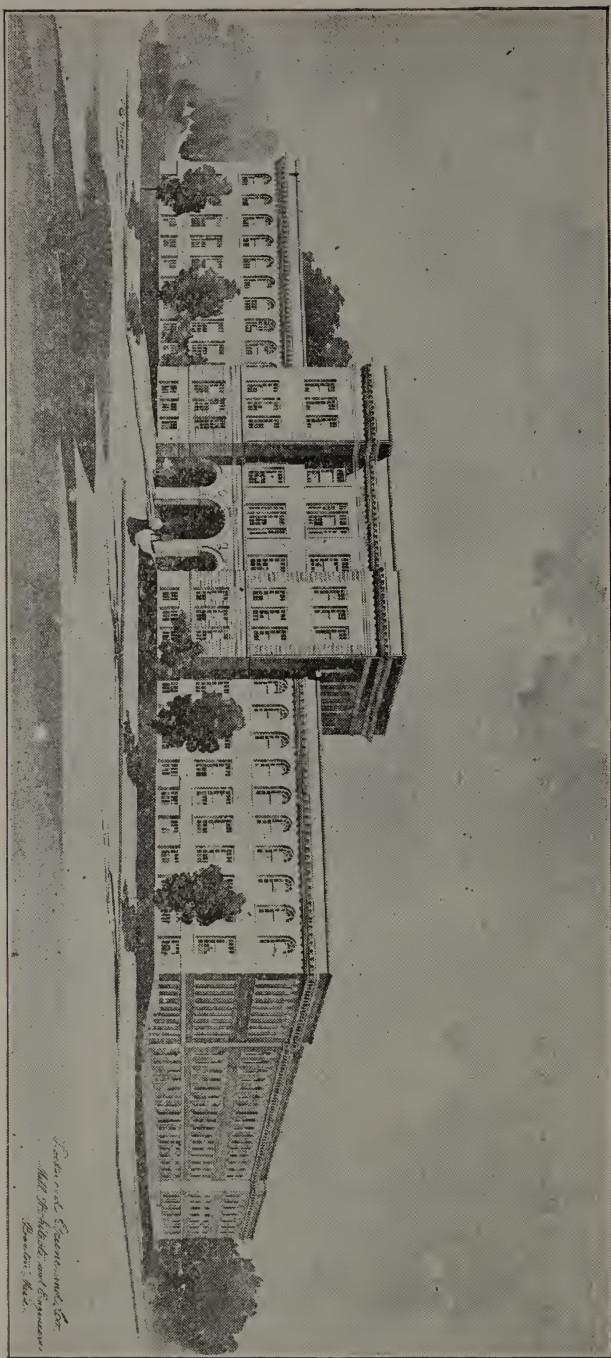
Wool is the general term used to distinguish the fibrous covering obtained from sheep and allied animals applied to textile purposes. It is a wavy, flexible, fibrous material which varies in length and diameter according to the conditions under which it has been produced and the variety of sheep from which it is obtained. Sheep occur chiefly between the latitudes 60° north and 60° south, and are indigenous to mountainous regions. The origin of the domestic varieties is very obscure from the very earliest times recorded in history. It has been associated with man, and undoubtedly provided food and clothing. Many authorities support the view that it has descended by a long series of variations from a wild ancestor, such as the musman and allied animals; this is only conjecture. Early history shows these to have been two distinct types of domestic sheep in existence at a very remote period, and

this is the only point from which we can begin to trace its descent with any degree of certainty. The affinities exhibited by existing breeds afford a clue to their relations. Changes have been wrought by breeders and climatic conditions, characteristic features have altered and some breeds have practically ceased to exist, as for instance the English Ryeland and Teeswaters, or become incorporated into other types. New varieties have been created, as for example the Colonial crossbreeds which have become such an important factor in the wool market.

PEDIGREE OF SHEEP.



As stated, the sheep is confined



SOUTHWICK HALL, LOWELL TEXTILE SCHOOL, LOWELL, MASS., U. S. A.

chiefly to the countries forming the temperate zones. The wool-producing area is therefore very extensive, bounded on the north by Iceland and on the south by Falkland Islands and Patagonia. The southern zone embracing Australia, Cape Colony and the Argentine Republic, furnish the greater portion of our fine wools of the merino type used for combing purposes.

The northern zone may be conveniently divided into two parts. The eastern portion comprising Turkey, Persia, Egypt, Afghanistan, Thibet and China are characterized by the low type of wool they produce. The western parts comprising England and the remaining countries yield wool of a medium type. The English wools may be divided into three well defined groups: 1st the lustres and demilustres, such as the Lincoln, Wensleydale, Devons and Yorks; the short wools of the down type and the mountain kinds, such as the Scotch, Welsh and Blackface.

Among the wool-producing countries of the world Australia occupies the premier position both for quality and quantity. Although possessing no indigenous breeds its vast resources of natural pastures combined with the suitability of its climate and general conditions render it particularly suitable

for wool growing and most of the leading varieties of sheep are now very successfully reared. Its fine wools of the merino type are unequalled and the longer and stronger varieties are of the very best class. The south, east and western portions form the principal growing area comprising parts of Victoria, New So. Wales, Queensland, South and West Australia, the chief ports of shipment being Melbourne, Sydney, Bresham and Adelaide. The Victorian wools are remarkable for their excellence and the Port Philip Merino have for a long time occupied the foremost place on account of quality. They possess all the features required in a wool of the best type, fineness of fibre, length of staple, lustre, soundness, good color, comparatively clean, giving excellent results on scouring; they are used for making yarns of the very highest class. The moist coast districts produce crossbreds and wools of the Lincoln type of a very high standard. For quantity of wool produced New South Wales ranks first among the Australian colonies; Sydney wools are always in great demand for fine yarns. They lack the lustre of the Port Philips but are very fine and good growth, possessing a characteristic softness and pliability. The Adelaide wools are inferior to those mentioned,

being coarser in the hair, harsher to the handle, still they are useful though often very deceptive in their yield. Queensland, like New South Wales, produces merino wool chiefly; a great similiarity exists between them though they do not compare well with the best types of Sydney or P P., West Australian or Swan River wool, though fine, is short and dirty, lacking in style and requires to be mixed with the longer types to obtain strength. New Zealand now furnishes principally medium or crossbred wools, though formerly large quantities of merino were exported. The whole of South Africa is a wool-growing country. The Great and Northern Karoo, which the districts to the north and east form the principal area, though the south and south-western parts produce good wools. Merino and the native cape sheep are the chief varieties together with the Angora goats yielding mohair. Relatively the cape wools are superior to the better brands of Australian, being slightly coarser, shorter in length and sharper to the handle, but possessing a very good color. South America supplies a range of different types embracing both merinos and crossbreds; they are dirty and contain large quantities of vegetable matter such as fruits, seeds and burrs, which reduce its value. Though fine in

the fibre they are short in the staple, sharp to the handle and when compared with Australian types lack that strength, softness and elasticity which are the attributes of a superior wool, and are usually mixed with others to tone down.

Sheep are usually shorn once a year, either by hand with shears or by machinery. In some cases shearing is done at intervals of six months, the result being that the staple is short while the frequency of the operation induces a stronger growth. A feature of the Colonial wools is the classification adopted. The belly wool is first removed and if full of impurities is kept separate, the remainder of the fleece is next shorn and afterwards skirted, i. e., the edges of low parts taken out, these being usually divided in two qualities. When the necks are bad these are kept distinct and also the backs if very sandy. The amount of skirting depends on the condition of the fleece, the matted, stained and seedy parts being removed. The classer groups the fleeces in two heads—clothing or carding wools and combing, or those suitable for worsted spinning, each of these is further divided into 1st and 2nds, pieces, locks, etc. This division is somewhat arbitrary since clothing wools are often combed and vice versa. When the fleece contains

all the impurities collected during its growth it is termed *greasy*; if a short time before shearing the sheep have been washed either in streams or special tanks it is called *washed wool*, or if after shearing and classing it is cleansed by washing machines it is known as *scoured*. In addition to these we have *slipe* or *slipes*, wool that has been removed from the sheep which have been slaughtered, *skin* or *pulled* wool, when the skin has been treated with lime or acid to loosen the fibres so that they come out by the roots and leave the skin clean and free. *Dead* or fallen wool has been taken from animals that have died maybe from disease or starvation and in some cases often contain germs of disease which when contracted is fatal. The commercial value of a wool depends in the first instance upon what it is required for. In fixing its relative value the buyer considers several factors, viz.: length, fineness, strength, softness, uniformity, color, cleanliness, all of which are more or less variable. Public auctions are held periodically at various centres such as Melbourne, Sydney, Port Elizabeth, Buenos Ayres, London, Liverpool and Antwerp, where the buyers supply their requirements. These sales may extend over three or four weeks, and in London are usually

held at intervals of two months. Catalogues are issued by the brokers showing place of storage, brand and character of wool, number of bales and tare and in most cases the port of shipment and name of vessel. Each morning the buyers value the wool to be offered in the evening, giving limits to their agents. In London all wool bought must be paid for by the fourteenth day after date of invoice, this being termed the *prompt day*. When buying is done through an agent one-quarter per cent. commission is charged, on each lot bought an extra charge of one per cent., lot money, is made, while, if a sample is desired, 8d. for each draw must be paid. Small lots of less than three bales, together with damaged lots, are left till the last and are known as "star lots." A rule of the saleroom is that the purchaser of one lot has the first claim of the next at the price of the room up to three bids by declaring "last buyer," thus he has the opportunity of getting several lots in succession.

Almost every district yields a wool distinguished by some peculiar features. The same variety of sheep produces a fleece of much better quality in some areas than others, and there is no doubt but that climate, soil, food and contour exercise a primary influence in de-

termining its character, hence some districts are noted for their long, deep grown wools, while others yield one which is short, fine and wavy. The fine wool-producing countries are characterized by their dry, equable climate and the light sandy nature of their soil. They are situated in approximately the same latitude, viz. 30° , and are very similar with regard to temperature. No records are available covering the whole area, but a comparison of the principal centres show their relation, thus we find that the merino reaches its highest development and yields the best results in those districts which have a mean annual temperature of from 60° to 64° F. Taking Sydney, Brisbane, Melbourne and Adelaide, their average mean is 64° , at Graaf Rhenit, situate in the Karoo, in South Africa, 64° ; Buenos Ayres, 63° ; Central and Southern Spain and the South West of France, the home of the merino, 64° . Again, Sydney, Melbourne, the Great Karoo and Buenos Ayres occupy the same relative position with regard to the line of snowfall, all being close to the southern limit. In countries having a light temperature and very dry climate, such as Arabia, Persia, Northern India and Southern Asia in general, where the mean annual temperature is about 80° , the fleece becomes hairy,

coarse and harsh in character, but has in some instances a very fine undergrowth of short wool. Where a lower and more regular temperature prevails, together with a somewhat moist climate, as in Great Britain and Europe, which have a mean temperature of about 50° , wools of a medium character are produced, which although stronger and courser than the merino, are very regular and true in growth, with the exception of the mountain wools, these being often run with coarse dead hairs.

(To be continued.)

"I'm tired of life, in fact, I wish I was dead" sighed the despondent man.

"Then why don't you see a doctor" remarked a cheerful idiot.

The vulgar call good fortune that which really is produced by the calculations of genius.—*Emerson*.

No way has been found for making heroism easy, even for the scholar.—*Emerson*.

The imagination wakened brings its own language, and is always musical.—*Emerson*.

Jimmy—Aw, I don't believe this nonsense about gettin' a lickin' before night if you spin a chair around.

Tommy—I do. I tried it on grandpa's office chair while he was taking a nap.—*Indianapolis Journal*.

A SHORT METHOD FOR DETERMINING THE PRINCIPAL REQUIREMENTS NECESSARY FOR THE REPRODUCTION OF A FABRIC.

JAMES H. CUTTLE, Lowell Textile School, Class of 1899.

Although the subject of "Pattern Analysis," rightly considered, can only lay claim to a secondary place in the designer's curriculum, yet *its importance is very apparent*. The pioneers of original textile design may use what invectives they like against the wholesale copying or re-adaptation of French and German design, and rightly so; but in another sphere, *skill in analysis is so useful an adjunct* that the designer can *ill afford to ignore its importance* (Alfred F. Barker, Head Master, Textile Department, Bradford Technical College).

"Pattern Analysis" or "Cloth Analysis" is in itself so broad a subject that it would be useless to lay down any fixed formula for the *complete* analysis of fabrics, as each type of cloth requires its own specific treatment, yet to a certain extent all cloths can be governed by the same rules and calculations.

My aim, in this thesis, is to show a short, simple and accurate method of analysis, by the use of which, the principal requirements for the reproduction of a fabric may be

determined. In order to do this, I shall take a sample of cloth and carry the analysis through, giving the rules and tables, which I have prepared, for each step and also the necessary calculations.

In making an analysis, whether by a short method or by a long method, carefulness in every detail is very essential, as hundreds and sometimes thousands of pieces of goods are often made from a single analysis.

These are the points which I shall consider in analysing a given piece of cloth:

- 1 Weight of one yard, 42 ins. wide.
- 2 Weight of warp in one yard.
- 3 Weight of filling in one yard.
- 4 Ends of warp per inch.
- 5 Picks of filling per inch.
- 6 Counts and quality of warp yarn.
- 7 Counts and quality of filling yarn.
- 8 Weave.

First, secure weight of 12 sq. ins. of cloth in grains. I find the 12 sq. ins. of cloth to weigh 21.2 grs.

As all my tables are prepared upon the assumption that we have 12 sq. ins. of cloth to work with and as it is not always convenient to secure as much as this, it may be necessary to use the following equation, before proceeding with the analysis :

$$\frac{\text{Weight in grains} \times 12}{\text{No. of square inches}} = \text{wgt. of 12 sq. in.}$$

Now that we have the weight of 12 sq. ins. (21.2 grs.) it will be very simple to find the ounces per yard by using the following rule and table.

RULE.

To find ounces per yard for any width, multiply the weight in grains of 12 sq. ins. by the number opposite the required width in the following table :

TABLE.

Width	Constant	Width	Constant
24 ins.	.1645	48 ins.	.329
25 "	.1714	49 "	.336
26 "	.1783	50 "	.343
27 "	.185	51 "	.3497
28 "	.192	52 "	.3565
29 "	.199	53 "	.3634
30 "	.2057	54 "	.3702
31 "	.2126	55 "	.377
32 "	.2194	56 "	.384
33 "	.2262	57 "	.391
34 "	.233	58 "	.3977
35 "	.240	59 "	.4046
36 "	.247	60 "	.4114
37 "	.2547	61 "	.4182
38 "	.2606	62 "	.425
39 "	.2674	63 "	.432
40 "	.2742	64 "	.439
41 "	.281	65 "	.4456
*42 "	.288 *	66 "	.4524
43 "	.295	67 "	.4592
44 "	.3017	68 "	.466
45 "	.3085	69 "	.473
46 "	.3154	70 "	.480
47 "	.3222		

Upon referring to the table I find that the constant for 42 ins. is .288; therefore by rule : 21.2 grs. x .288 = oz. per yard.

$$\begin{array}{r} 21.2 \text{ grs.} \\ .288 \\ \hline 1696 \\ 1696 \\ 424 \\ \hline 6.1056 \end{array}$$

1. The cloth weighs 6.11 ounces per yard. The next step is to obtain the ounces of warp and filling, respectively, in one yard. In order to do this it will be necessary to separate the warp and filling threads and secure the weight in grains of each. In separating the warp from the filling, I found that the blue ends in the warp were cotton and the rest of the warp worsted. It was therefore necessary to keep the blue ends separate from the black ends as well as from the filling which is worsted. I think that it is a good plan when pulling the cloth apart to count the ends of warp and picks of filling in the entire sample, then by dividing the total number of warp ends by 4 and the picks of filling by 3 I get the ends and picks per inch more exactly than if I took one square inch in any part of the cloth, as I avoid the possibility of getting an inch in which the ends and picks are overcrowded, or the contrary.

After pulling the cloth apart,

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counting the threads and picks, and weighing each kind of yarn, i. e., cotton warp, worsted warp and worsted filling, I find myself in possession of the following data:

IN 12 SQUARE INCHES.

Cotton warp	6.0 grains	204 ends
Worsted warp	6.4 "	204 "
Worsted filling	8.8 "	240 picks

21.2 grains

204 div. by 4 ins. = 51 ends per in. of cotton warp.

204 div. by 4 ins. = 51 ends per in. of worsted warp.

240 div. by 3 ins. = 80 picks per in. of worsted filling.

In order to get the ounces of warp and filling in one yard it will be necessary to use the same rule and table which I have already used to find the ounces per yard of cloth.

Constant for 42 ins. = .288.

Cotton warp in 12 sq. ins. = 6 grains.

.288
6

1.728 1.73 oz.

Worsted warp in 12 sq. ins. = 6.4 grains.

.288
6.4

1152
1728

1.8432 1.84 oz.

Worsted filling in 12 sq. ins. = 8.8 grains.

.288
8.8

2304
2304

2.5344 2.53 oz.

(To be continued.)

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TEXTILE REHEARSALS.

The course of lectures and demonstrations on the subject of cloth manufacturing, which has been established by A. Shuman & Co., Boston, is now well under way, says *Fibre and Fabric* for June 8, and has become very popular among young men who desire to know something about the woolen business, and incidentally to gather

material from which to prepare essays, for the best of which a free scholarship in the Massachusetts Institute of Technology will be awarded. Last Saturday's lecture in the big store at Shuman Corner was well attended. Mr. Rymarczick, the lecturer and demonstrator, is a well informed mill man, having had a lifetime of experience in the weave room and other departments of the woolen factory.

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He has collected, for this special purpose, a large amount of material with which to show how each process is carried out, what stock, dyestuffs, acids, soaps, etc., are used, and particularly to give a clear idea of what is put into the "batches" as adulterants or substitutes for wool. At the last lecture, the young men appeared to be very much interested; the best of order prevailed, and all showed that they were there to learn; several took notes. First it was demonstrated how a pure wool fabric was manufactured. As the lecture proceeded samples of batches, dyed samples of cotton and woolen yarns, sketches of machines, large photographs of dressing frame, drawing-in frame, loom, etc., were passed around for each one to examine, and finally a piece of all wool goods. After calling attention to the demand (?)

for cheaper fabric, Mr. Rymarczick started around his samples of shoddy, good and bad shoddy, new rag shoddy, old rag shoddy and shoddy that was largely composed of waste, sticks and other refuse matter. He told how it was worked over in the picker, card, etc., together with small percentages of cotton and wool, and by careful handling made into threads and woven into fancy cassimeres, but the unfinished samples shown appeared more like brown, rough canvas than a fabric intended to be made into clothing. A sample that had been gigged was shown, and then pieces that had been dyed and finished; also some that had been printed, and it certainly took a long stretch of the imagination of the inexperienced ones to realize that the piece that was ready to wear was the same as that taken from the loom. Pieces of

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PLEASE WRITE FOR CATALOGUE.

all wool goods were also shown so that the two fabrics could be compared side by side. The samples of cloth that had been exposed to the weather for various periods were conclusive evidence that the cheaper fabric was costly at any price, the colors and firmness of the cloth having departed or being sadly affected by an exposure of a short time. The effect of the potash test, to ascertain how much wool and how much cotton a piece contained, was also explained and demonstrated by a number of samples that had been treated. The acid test was also shown in the same way. After a brief history of the increase of the shoddy

business and the consequent injury to the wool industry and a few general remarks as to the deception of the people practiced by many clothiers and the really small value of cheap clothing, the lecture was closed and some of the boys started for the platform, probably to get their minds relieved upon certain points that had suggested themselves as the lecture proceeded, for it is a broad subject and a complete knowledge of how a piece of cloth is made cannot be explained in an hour.

On account of the summer vacation season, these rehearsals will be discontinued after the 15th inst., and taken up again in the fall.

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They will then be continued for a certain season, after which the list will be open for essays on the subject, and the subsequent award of a scholarship.

It is understood that besides a scholarship in the Institute of Technology, one will be awarded in the Boston University also.

HINTS TO EMPLOYEES.

There is only one spirit that achieves a great success. The man who seeks only how to make himself useful, whose aim is to render himself indispensable to his employer; whose whole being is animated with the purpose to fill the largest place in the walk assigned to him, has in the exhibition of that spirit the guarantee of success. He commands the situation, and shall walk in the light of prosperity all

his days. On the other hand, the man who accepts the unwholesome advice of the demagogue, and seeks only how little he may do, and how easy he may render his place, and not lose his employment altogether, is unfit for service. As soon as there is a supernumerary on his list, he becomes disengaged as least valuable to his employer. The man who is afraid of doing too much, is near of kin to him who seeks to do nothing, and was begot in the same family. They are neither of them in the remotest degree a relation to the man whose willingness to do everything possible to his touch, places him at the head of the active list.—*Scientific American*.

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EDITORIAL.

It is one thing to work ; it is another thing to do work. Yet, men generally are inclined to think that they ought to have credit and ought to receive pay according to the number of hours or days they spend at a piece of work, rather than according to the work they do in a given time. A man may faithfully work all day, looking

among his papers for a missing memorandum which he needs to enable him to do a piece of work for which he expects payment.

It would hardly be fair, however, for him to include a charge for that day's work in his estimate of the value of his services to the man who employs him. So, again, a man may work without any system, and by aimless methods waste five times as many hours as he uses to advantage. The work he does bears no fitting comparison with his working. In fact, the unfairest estimate a man can put upon his work is by measuring it according to the time he spends in its doing.

Before a man congratulates himself on having worked hard and honestly all day, or all the week through, he would do well to stop and see whether he has done much work, or has merely been at work, and if he finds that he has little to show for his working, it behooves him to learn how to work, in order that work may be a result of his working.

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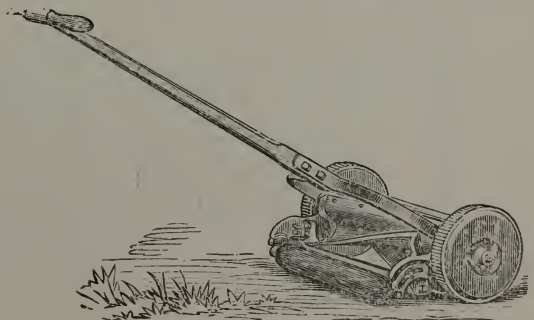
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In all ages, from the time of King Solomon, if not for hundreds of years previously, and in all countries, proverbs have found a place in the daily intercourse of private and business life, and though very good things in their way, are liable, like other things, to be abused or misapplied. Elderly persons are especially fond of instructing the young by means of proverbs, sometimes greatly to their disadvantage.

To show how the misapplication of proverbs may mar the future of promising and aspiring young persons, more especially in connection with the textile industry, we propose to quote some of the familiar ones and give examples of the

results effected by their too literal interpretation.

It is well known that operatives, as a class, are of a wandering disposition, changing from one situation to another, or from town to town and state to state, and the proverb "a rolling stone gathers no moss" has, no doubt, been applied to a young man upon leaving his native place and setting out to see a little of the world. He is told that he had far better stay where he is known; that the chances for promotion are much better in a place where he has spent his life than they would be in a strange town or city, and many other reasons are urged against his becoming a "rolling stone." All these reasons may

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be very plausible, and in some cases very true, but there are other reasons why he should not stay in one place and "gather moss," if he feels disposed to roam.

The stone that is continually in motion acquires a polish, and if it possesses any value in itself will soon attract attention; whereas the stone that lies secluded and becomes moss-covered is liable to lose its identity altogether. It is hardly to be expected that a man who spends the whole of his life in one mill in a small manufacturing town, can ever be such an experienced workman as one who has traveled

from place to place, working in different mills, on different goods, becoming acquainted with various methods of doing work, and gaining practical experience of such value as will fit him to occupy the best position it is possible to obtain. Because such a one is migratory in his habits, it does not follow that he will become the restless, shiftless, penniless, tramp his advisers see with their mind's eye when they try to dissuade him from setting forth from his home. The majority of our most skilled workmen, who are occupying positions of responsibility in large mills, are

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not those who have learned their business and spent the greatest part of their lives in them, but are those who have gathered knowledge, little by little, in various places and have worked their way up from the lowest rung of the ladder to the highest. They are stones that have rolled around, getting a rough place polished here, an excrescence knocked off there, a little rubbing against some other stone in another place, and so on until the beauty and brilliancy of their polish makes itself evident to those most capable of appreciating the same and the future of such an honored position as the reward of their exertions.

But we would not advise every young man to leave his native place and wander forth on the world's highway. All have not the same will power and determination to

push their way in spite of difficulties. All have not the same qualities that go to make up a first-class workman. Two persons may set out at the same time; may both go through the same experiences; both have the same opportunity, and yet one will attain eminence, while the other fails grievously. It is a young man's duty to consider well whether it will be any benefit to himself to become a "rolling stone." He may have the desire to go forth and make acquaintance with other places and other things, and yet circumstances may be favorable to his remaining where he is and the prospect good if he does so remain. Such a one we would advise to stay at home and gather diligently such "moss" as is likely to come in his way. Still there are a good number who would be much benefited by a little rolling around,

STUDY

the points of our different machines and compare with others.

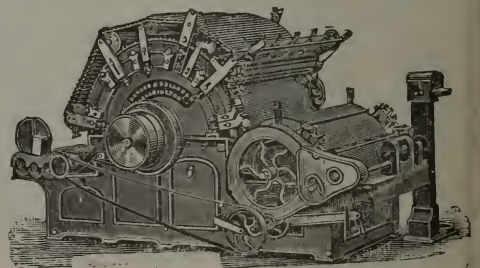
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the merits and you will be convinced beyond a doubt of their superiority.

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even though they might have to pay for the experience gained by so doing. All stones of any value lose a little in the process of being prepared for the position destined for them to occupy, but their loss eventually becomes their gain in increased value placed upon them because of their form or lustre. So though experience may have to be paid for, the gain in most instances greatly affects the outlay.

There can be little doubt that the author of the above proverb had in view the temptations to thriftlessness attaching to continual change of location, and desired to warn those giving to change of almost inevitable result of such action—poverty. At the time when this proverb was written or first spoken the means of locomotion were limited and expensive, and such advice would be apt to carry some weight with it. But in these days, when locomotion is rapid,

easy and comparatively cheap, it is almost counted as absolute necessity that one should travel, be it so little. Those who have been working in small mills, where the prospect of promotion is not very promising, naturally gravitate toward the towns having larger mills, where they hope to make a better living, if not to make a mark in their profession. They carry their experience with them, and while they are gaining knowledge may be able to impart some, thus benefiting the mills they visit in return for the benefit they acquire. How many men whose names are familiar to us might have been unknown in the field of manufacturing if they had not become rolling stones? Not only so in manufacturing, but in literature, science, art, politics, and other spheres of public life, there are many examples of the good resulting from a little ambition on the part of some to

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see the world, and do what they could for its advancement and their own. The pioneers in our profession, that of the "designer," either from choice or necessity, were mostly "rolling stones" in one sense of the term.

We would therefore say to all those who desire to avoid becoming moss-covered fossils, hidden away in some obscure corner, who have a longing after better things, do not let the application of "a rolling stone gathers no moss" deter you from endeavoring to better your condition, for it may be that you are destined to become one of the greatest designers or superintendents the world has ever known, and only need a little confidence to set out on the road that shall lead to fame, if not to fortune.

Subscribe for the Textile Journal.

HOW CALICO GOT ITS NAME.

The derivation of this word is very interesting, and of such an ancient date in its origin Mrs. Leonowens says in her "Travels in India," that in the year 1498, just ten months and two days after leaving the port at Lisbon, Vasco da Gama, landed on the coast of Malabar at Calicut, or more properly Kale Rhoda, "City of the Black Goddess." Calicut was at that period not only a very ancient seaport, but an extensive territory, which, stretching along the western coast of Southern India, reached from Bombay and the adjacent islands to Cape Comorin. It was at an early period so famous for its weaving and dyeing of cotton cloth that its name became identified with the manufactured fabrics, whence the name calico. It is now

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North Billerica, Mass.

68 Franklin St., Boston, Mass.

**TALBOT MILLS,
Woolen Manufacturers*****NORTH BILLERICA, MASS.***

generally admitted that this ingenious art originated in India in remote ages, and from that country found its way to Egypt. It was not until the middle of the 17th century that calico printing was introduced into Europe. A knowledge of the art was acquired by some of the servants of the Dutch East India Company and carried to Holland, whence it was introduced in London in 1676. It is

surprising for grown-up-children, as well as our young folks, to learn that Pliny, as early as the first century, mentions in his natural history that there existed in Egypt a wonderful method of dyeing cloth. Calico cannot be despised when it boasts of such antiquity. The shoddy make-up of the present day may look down with contempt upon the calico dress, but what kind of lineage has it? the calico can proudly ask.

ELECTROLYSIS IN BLEACHING TEXTILES.

The application of electricity to manufacturing processes has long occupied the attention of scientists and inventors. Every effort has been made in recent years to simplify and cheapen the cost, not only of the necessary machinery, but of chemical elements as well. Dr. Oettel, a German professor,

together with Haas & Stahl, electricians in Aue, Saxony, have invented an apparatus for producing "chemic," or bleaching liquor, out of ordinary brine, the product being sodium hypochlorite, which is attracting considerable attention among textile manufacturers. It is claimed that the chemic obtained

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by this method produces a whiteness superior to that of the English bleaching liquor.

The ordinary apparatus is extremely simple, being mainly a trough or box of slate swung on trunnions, in a suitable frame, with an inlet for the brine and an inlet for the sodium hypochlorite resulting from the passage of a current of electricity through the brine as it runs through the box, the poles or electrodes being placed at opposite ends of the box.

Thermometers are suspended at the inlet and at the outlet in order to show at a glance the strength of the sodium hypochlorite, it having been found that every rise of 5° Celsius corresponds to 1 gram of free or active chlorine per liter (equal to 62 grains per gallon.)

In order to clean the apparatus the thermometers are removed and the trough reversed and cleansed

with a hose pipe. The electrodes last about one year and can be easily replaced. The bleaching liquor, the product of the apparatus, is eminently suitable for bleaching raw cotton, yarn, cloth, lace, and the finest embroidered fabrics made of cotton, linen, jute or flax, pulp paper, etc. It advantageously replaces chloride of lime for all purposes.

The advantages claimed for this system are —

(1) The electrolyzed solution possesses the highest decolorizing or bleaching power.

(2) The goods treated in the ordinary process of bleaching are not harmed in the least, and there is scarcely any appreciable loss in weight.

(3) Lime or magnesia salts are not deposited on the cloth, thereby eliminating any possible trouble in subsequent dyeing and printing.

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(4) Constant strength of liquor, which can be used as fast as made, if desired.

(5) Economy in cost of production.

The apparatus is constructed in three sizes, to produce, per 10 hours respectively, 350, 650, and 1,000 gallons of electrolyzed solution, containing three grams per liter (equal to 185 grains per gallon) of active chlorine prepared from brine of a strength of 6° Baume.

For purposes of comparison, we may say that 650 gallons of the electrolyzed solution contains 20 pounds of active chlorine, it would be necessary to use 70 pounds of bleaching powder, and the resulting 650 gallons would be found to

give considerably inferior results. The reason of this apparently inexplicable difference lies in the constitution of the electrolyzed liquor, which has been found to contain the following: Free chlorine, free hydrochlorous acid, sodium, hypochlorite, and chlorate of soda. It is chiefly the free hydrochlorous acid which causes the rapid bleach. This solution is absolutely harmless to the fibres of the threads, the best proof that they are in no way injured being that goods bleached by electrolysis only lose about 2 per cent, as against some 8 per cent for chloride-of-lime bleach.

When making further comparisons between the new and the old methods it is well to bear in mind

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The only satisfactory working machine made for pressing cloths, etc., to give a handsome finish which the goods retain. Repairing promptly attended to and all work warranted. Address

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NASHUA, N. H.

the well known fact that chloride of lime quickly loses its strength. It is invariably assumed to be of some given standard; but, as the hydrometer test is deceptive and other tests are troublesome, guessing is generally resorted to, and cloth is often spoiled. In this apparatus, the difference between the readings of the two thermometers is a ready and infallible test, though that is scarcely needed after once regulating the flow of the brine and the electrical current. The electrolyzed liquor is always of one strength; mixing or reducing is not necessary, neither does the apparatus need any attention.

Rock salt or sea salt may be used in addition to waste salt for mixing brine, providing it contains no mineral injurious to the subsequent processes.

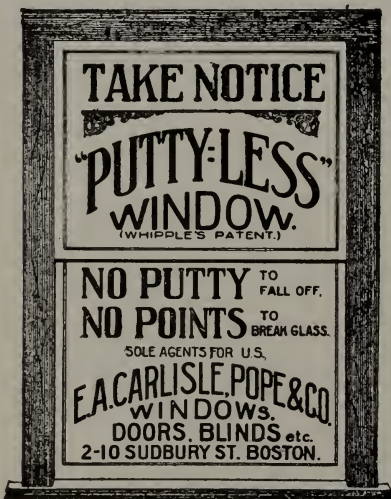
The crowd swayed towards the manager of the open-air show.

"What did you mean by advertising that tight-rope walker?" cried the spokesman.

"Just what I said," replied the unabashed manager.

"But the rope was laid on the ground," cried the spokesman, "and your fraud of a rope-walker just walked on it a step or two. Do you call that tight-rope walking?"

"Certainly," shouted the manager, "the man was tight, wasn't he?"



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THE PRODUCTION OF SMALL PATTERNS.

Students in technical schools are generally of an ambitious nature, which, whilst proper and praise-worthy, induces them to aim more at visible results more than at the thorough understanding of the principles upon which these results are based. Sometimes students will consider that they have done good work during the session when they have filled one or two design books with twills, fancy twills, compound twills, reversed twills, and figured ditto, whilst others try to fulfil the whole duty of man by spending the whole session in designing patterns that are much too large and tedious. The students should commence with the smallest figured weaves, and as opportunity permits notice the dif-

ferent appearance of the fabric when altered in counts of material or in number of ends and picks. The best way of obtaining a knowledge of the structure of cloth is by analysis of cloth already woven. There is no obstacle to the analysis of cloth, legally or otherwise, though in the case of registered designs there are certain obstacles in the way of reproducing them. When a student has accustomed himself to the dissection of small weaves such as twills, satins, etc., he will be better prepared for more complex patterns, such as spots, cords, diapers, gauzes, etc.

When designing a small pattern, the student or designer should see in his mind the effect he desires to produce and make a rough sketch.

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**GEORGE H. BACHELDER,**

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- - - Lowell, Mass.

This sketch must then be carefully studied, and if the pattern is intended to be woven by a dobby the designer should so arrange it when transferring it to point paper, that it may be woven on as few healds as possible. Suppose the design is a figured twill, consisting of twill or diagonal stripes with small spots between the stripes, the number of ends and picks will be similar in the design in most cases, and the number of ends and picks per inch in the cloth are generally similar, as twills are in most cases required to be at an angle of 45 degrees, with the twill stripes directed towards the left on the face side. When the designer has placed his design on point paper, he must ascertain the number of healds required for his draft or method of drawing in the healds. Patterns, however, having twill stripes as a basis generally require as many healds as there are ends in the

pattern, though by the introduction of small spots between the diagonal lines, sometimes certain ends in the design may be raised in a manner similar to the way in which others are raised.

In this case, those ends which are raised and depressed in the same order may be drawn in on the same heald, though of course this necessitates the healds to be of different sett. We will take the case of the smallest "figured" pattern possible, a huckaback. This requires 4 ends and 4 picks for the design, 1st pick, lift 2, 4; 2d pick, 1, 2, 3; 3rd pick, 2, 4; 4th pick, 1, 3, 4. By noticing the way the ends are raised it will be seen that the first and third ends are raised and depressed simultaneously, therefore the first and third ends may be drawn on one heald, the other two ends requiring separate healds; therefore three healds are required for this pattern, but

---

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one heald will have twice the number of threads that each of the others possess. It is advantageous in weaving generally for the heaviest heald to be placed in front of the others, as the front healds control the ends better than the back ones, making a clearer shed. Therefore in this case by putting the heaviest heald in front, the draft would be 1, 2, 1, 3.

This method of drafting is not practised in every case, as many weavers would prefer a straight draft with a larger number of healds, but in patterns requiring say from 12 ends and upwards, some method of reducing the number of healds is advisable and generally necessary. When the draft or method of drawing in the yarn has been found and put on paper, we must find the pegging plan or tie-up as it is sometimes called. By this we mean the order in which the healds are raised and depressed. In the

case of simple twills the healds are raised consecutively, but in figured weaving this is impossible. Take the case of the huckaback mentioned above, the third end being on the same heald as the first end, we require point paper for three healds and four picks. If we number all the ends in the design, then cross out the end marked No. 3 and transfer the remaining ends, we have before us the pegging plan of the design, in which we are shown the order in which the healds are raised at each pick, and according to which the lags of the dobby are pegged. This method of drafting and ascertaining the pegging plan may be applied to any dobby design.

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Tampico Brushes 13c. per inch.

Bristle Brushes 39c. per inch.

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In the majority of mills the question of ventilation is never taken into consideration by the proprietors. The air is visited with a consideration of odors arising from gas or other causes, with the result that the employes experience a dull, heavy, languid feeling, which they are apt to ascribe to every cause but the right one. This is especially so during the winter months, when the windows are kept tightly closed and the evil intensified by the fullest use of the heating apparatus and aggravated by the continuous use of gas; each gas light consuming as much oxygen as eight persons.

Employers will do well to look into this question from an economical standpoint. If employes, through inhaling a poisonous at-

mosphere, have their energies stagnated, there must, of necessity, result a serious loss to employers, and the larger number employed the greater will be the loss.

The yearly profits of a business are made up from the aggregate of small margins, and duly entered in the books of the concern. So also the losses, as far as bad debts are concerned. But what record can be kept of the loss sustained through the want of proper ventilation? None whatever. The proprietors go on year after year, in blissful ignorance of any financial leakage from such a cause. Sharp, shrewed business men at the head of large establishments, look into this matter. It will pay you.

Pure air is what the operative needs  
To aid him throu' his daily tasks;  
Foul atmosphere consumption breeds—  
Pure air! Pure air! is what we ask



*"Lest Ye Forget"....*

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Is a Jeweler, and Does All Kinds of Repairs.

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LOWELL, MASS.

# Lowell Textile Journal

## WORSTED SPINNING.

### I—WOOL.

(Continued from August Number.)

I have now determined the following :

1st Weight of 1 yard, 6.11 oz.

2d Weight of warp yarn } 1.73 oz. cotton.  
1.84 oz. worsted.

3d Weight of filling yarn, 2.53 oz.

4th Ends per inch of warp } cotton 51.  
worsted 51.

5th Picks per inch of filling, 80.

With this data in my possession it will be very simple to determine the size or counts of the warp and filling yarns by the use of the following rule and table.

TABLE FOR 42 INCHES WIDE.

| Threads | Cotton | Wool  | Worsted |
|---------|--------|-------|---------|
| 20      | 16.0   | 8.40  | 24.0    |
| 21      | 16.8   | 8.84  | 25.2    |
| 22      | 17.6   | 9.24  | 26.4    |
| 23      | 18.4   | 9.66  | 27.6    |
| 24      | 19.2   | 10.08 | 28.8    |
| 25      | 20.0   | 10.50 | 30.0    |
| 26      | 20.8   | 10.92 | 31.2    |
| 27      | 21.6   | 11.34 | 32.4    |
| 28      | 22.4   | 11.76 | 33.6    |
| 29      | 23.2   | 12.18 | 34.8    |
| 30      | 24.0   | 12.60 | 36.0    |
| 31      | 24.8   | 13.02 | 37.2    |
| 32      | 25.6   | 13.44 | 38.4    |
| 33      | 26.4   | 13.86 | 39.6    |
| 34      | 27.2   | 14.28 | 40.8    |
| 35      | 28.0   | 14.70 | 42.0    |
| 36      | 28.8   | 15.12 | 43.2    |
| 37      | 29.6   | 15.54 | 44.4    |
| 38      | 30.4   | 15.96 | 45.6    |
| 39      | 31.2   | 16.38 | 46.8    |
| 40      | 32.0   | 16.80 | 48.0    |
| 41      | 32.8   | 17.22 | 49.2    |
| 42      | 33.6   | 17.64 | 50.4    |
| 43      | 34.4   | 18.06 | 51.6    |
| 44      | 35.2   | 18.48 | 52.8    |
| 45      | 36.0   | 18.90 | 54.0    |
| 46      | 36.8   | 19.32 | 55.2    |
| 47      | 37.6   | 19.74 | 56.4    |
| 48      | 38.4   | 20.16 | 57.6    |
| 49      | 39.2   | 20.58 | 58.8    |
| 50      | 40.0   | 21.00 | 6.00    |
| *51     | *40.8  | 21.42 | *61.2   |
| 52      | 41.6   | 21.84 | 62.4    |
| 53      | 42.4   | 22.26 | 63.6    |
| 54      | 43.2   | 22.68 | 64.8    |
| 55      | 44.0   | 23.10 | 66.0    |
| 56      | 44.8   | 23.52 | 67.2    |
| 57      | 45.6   | 23.94 | 68.4    |
| 58      | 46.4   | 24.36 | 69.6    |
| 59      | 47.2   | 24.78 | 70.8    |
| 60      | 48.0   | 25.20 | 72.0    |
| 61      | 48.8   | 25.62 | 73.2    |
| 62      | 49.6   | 26.04 | 74.4    |
| 63      | 50.4   | 26.46 | 75.6    |
| 64      | 51.2   | 26.88 | 76.8    |
| 65      | 52.0   | 27.30 | 78.0    |
| 66      | 52.8   | 27.72 | 79.2    |
| 67      | 53.6   | 28.14 | 80.4    |
| 68      | 54.4   | 28.56 | 81.6    |
| 69      | 55.2   | 28.98 | 82.8    |
| 70      | 56.0   | 29.40 | 84.0    |
| 71      | 56.8   | 29.82 | 85.2    |
| 72      | 57.6   | 30.24 | 86.4    |
| 73      | 58.4   | 30.66 | 87.6    |
| 74      | 59.2   | 31.08 | 88.8    |
| 75      | 60.0   | 31.50 | 90.0    |
| 76      | 60.8   | 31.90 | 91.2    |
| 77      | 61.6   | 32.34 | 92.4    |
| 78      | 62.4   | 32.76 | 93.6    |
| 79      | 63.2   | 33.18 | 94.8    |
| *80     | 64.0   | 33.60 | *96.0   |



| Threads | Cotton | Wool  | Worsted |
|---------|--------|-------|---------|
| 81      | 64.8   | 34.02 | 97.2    |
| 82      | 65.6   | 34.44 | 98.4    |
| 83      | 66.4   | 34.86 | 99.6    |
| 84      | 67.2   | 35.28 | 100.8   |
| 85      | 68.0   | 35.70 | 102.0   |
| 86      | 69.6   | 36.12 | 103.2   |
| 87      | 70.4   | 36.54 | 104.4   |
| 88      | 70.4   | 36.96 | 105.6   |
| 89      | 71.2   | 37.38 | 106.8   |
| 90      | 72.0   | 37.80 | 108.0   |
| 91      | 72.2   | 38.22 | 109.2   |
| 92      | 73.6   | 38.64 | 110.4   |
| 93      | 74.4   | 39.06 | 111.6   |
| 94      | 75.2   | 39.48 | 112.8   |
| 95      | 76.0   | 39.90 | 114.0   |
| 96      | 76.8   | 40.32 | 115.2   |
| 97      | 77.6   | 40.74 | 116.4   |
| 98      | 78.4   | 41.16 | 117.6   |
| 99      | 79.2   | 41.58 | 118.8   |
| 100     | 80.0   | 42.00 | 120.0   |
| 101     | 80.8   | 42.42 | 121.2   |
| 102     | 81.6   | 42.84 | 122.4   |
| 103     | 82.4   | 43.26 | 123.6   |
| 104     | 83.2   | 43.68 | 124.8   |
| 105     | 84.0   | 44.10 | 126.0   |
| 106     | 84.8   | 44.52 | 127.2   |

## RULE.

To find the size or counts of warp and filling yarns when the ends and picks per inch and the ounces per yard of warp and filling are known.

Divide the ounces per yard of warp or filling into the number (for cotton in the second column, wool in the third and worsted in the fourth) opposite the ends or picks per inch in the preceding table.

I have prepared tables for all the ordinary widths but thought it unnecessary to give more than this one.

*Cotton warp. 51 ends. 1.73 ounces.*

Upon referring to the table I find that the number (in the second

column) opposite 51 threads is 40.8 therefore, by rule  $40.8 \div 1.73 = \text{size of cotton warp} \div \% \text{ of take-up in weaving} = \text{size of yarn to be spun} :$

$$\begin{array}{r}
 23.58 \\
 \hline
 1.73 \mid 40.8000 \\
 \underline{34.6} \\
 6.20 \\
 \underline{5.19} \\
 1.010 \\
 \underline{.865} \\
 .1450 \\
 \underline{.1384} \\
 660 \qquad 23.58
 \end{array}$$

Take up in weaving = 6%.

$$\begin{array}{r}
 23.58 \\
 \underline{1.06} \\
 141.48 \\
 \underline{2358} \\
 24.9948 \qquad 24.99
 \end{array}$$

Upon examination of the yarn I find it to be a 2-ply thread, spun from carded cotton, therefore

$24.99 \times 2 = 49.98$  or  $2 \mid_{50s} - 2 \mid_{50s}$  cotton.  
*Worsted warp. 51 ends. 1.84 ounces.*

Constant for 51 threads of worsted is 61.2 by rule.

$$\begin{array}{r}
 33.26 \\
 \hline
 1.84 \mid 61.2000 \\
 \underline{55.2} \\
 6.00 \\
 \underline{5.52} \\
 .480 \\
 \underline{.368} \\
 .1120 \\
 \underline{.1104}
 \end{array}$$

Take-up =  $8\frac{1}{2}\%$ .

33.26  
1.08

266.08  
3326.

35.9208

35 92

It is a single yarn of very fine quality— $1\frac{1}{368}$  xxx.

*Worsted filling. 80 picks. 2.53 oz.*

Constant for 80 threads of worsted is 96.

It is a single yarn of fine quality but not as long or as fine as the worsted warp. About x quality. The weaving take-up is about  $20\frac{1}{2}\%$ .

By rule.

37.94  
2.53 | 96.0000  
75.9  
20.10  
17.17  
2.390  
2.277  
.1130  
.1012

37.94  
1.20

758.80

3794.

45.5280

Filling  $1\frac{1}{458}$  x.

*Weave.* The principal point about the weave is the kind of a loom that will be required to reproduce the fabric, i. e. cam, dobby or jacquard.

Upon "picking out" the weave

I find that it is a 9 harness whipcord, 45 ends of warp being "drawn in" to the right and 45 ends to the left, and as the warp is dressed 5 ends of the blue cotton and 5 ends of worsted and the weave repeating on 9 threads no 2 ends in each 45 are weaving alike, that is to say, the weave the first time would use up 5 blue ends and 4 black ends, then the second time would commence on a black end, taking 1 black, 5 blue and 3 black, etc. and so the weave does not have 5 blue and 4 black ends until it has used up 45 ends, then as the twill is reversed for 45 ends, the total repeat comes on 90 ends.

I think that the cloth is woven with the cotton yarn dyed and the worsted grey, then cross dyed black.

I will now give a summary of the analysis showing how short the method is.

#### SUMMARY.

*Worsted and Cotton Striped Suit'g.*

42 in. wide. 12 sq. ins. = 21.2 grs.

|                 | Per inch | In. 12 sq. ins. |
|-----------------|----------|-----------------|
| Cotton warp     | 51 ends  | 6.0 grains      |
| Worsted warp    | 51 ends  | 6.4 grains      |
| Worsted filling | 80 picks | 8.8 grains      |
|                 |          | 21.2            |

For 42 inches.

Cotton warp, 6.0 grains x .288 = 1.73 oz.  
Worsted warp, 6.4 grains x .288 = 1.84 oz.  
Worsted filling, 8.8 grains x .288 = 2.53 oz.

Cloth, 21.2 grains x .288 = 6.10 oz.

Cotton warp, 40.8 div. by 1.73 equals 23.58, plus 6 per cent.

Worsted warp, 61.2 div. by 1.84 equals 33.26, plus 8 per cent.

Worsted filling, 96.0 div. by 2.53 equals 37.94, plus 20 per cent.

23.58 by 1.06 equals 24.99 equals  $\frac{2}{5}$ s cotton.

33.26 by 1.08 equals 35.92 equals  $\frac{1}{3}$ s x x x.

37.94 by 1.20 equals 45.52 equals  $\frac{1}{5}$ s x.

*Data obtained in preceding analysis.*

1 Weight of one yard 42 in. wide equals 6.11 oz.

2 Weight of warp in one yard 42 in. wide, cotton warp equals 1.73 oz. Worsted equals 1.84 oz.

3 Weight of filling in one yard 42 in. wide, worsted filling equals 2.53 oz.

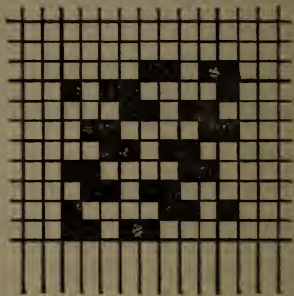
4 Ends of warp per inch equals 102 ends.

5 Picks of filling per inch equals 80 picks.

6 Counts and quality of warp yarn, cotton warp equals  $\frac{2}{5}$ s carded cotton. Worsted warp equals  $\frac{1}{3}$ s x x x.

7 Counts and quality of filling yarn, worsted filling equals  $\frac{1}{4}$ s x.

8 Weave. 9 harness whipcord as herewith, 45 ends to right and 45 ends to left.



## COLORING AND BLENDING.

Assuming that the principles which should be observed in the blending of textile fibres to be fully understood so far as solidity and proportions are concerned, and taking the examples of mixtures produced by simple black and white, the student may proceed to still further variations in order to gain different effects in shades. For instance, four parts white, two black and half crimson. The tone given to this mixture by the latter item resembles a kind of an iron gray. While it is easy to understand that, were not the proportions strictly accurate as to the lengths of staple, or were they to

vary in succeeding blends, the same ratio of parts would result in varying effects as to the hue imparted. Again, say four white, three black, and one yellow; four white, four black, and one yellow; three white, three black, half yellow; four black, two white, and half scarlet. From these examples, it will be seen how the black and white have been varied in the gray, in order to provide the proper foundation for the reception of the lively colors, yellow and scarlet. No doubt that before these particular results were obtained, because they are practical compounds, several experiments would have been



tried and modifications made as to the amount of black, white, yellow, and scarlet before the ideal was realized. For the student who is anxious to succeed in this direction, and it is an important one, and becoming more so in obtaining choice effects in fabrics composed of mixture yarns, he may experiment with great advantage upon small portions of materials at a small cost and not much labor, except to the extent which he may go in gaining all the diversity possible.

It would be wisest to begin with the mixtures from black and white, say in eight parts given in our last issue, starting with seven parts black and one white; six black and two white; and so on, so as to obtain seven graduated shades, which afford better scope for inspection. If animal wool be not procurable or too costly, a few pounds of white cotton wool will supply a good substitute, one ounce of which will contain many fibres and a little weight suffice for the experiment. There are small bottles of dyes to be obtained, of any shade required, and as many lots dyed to as many shades as intended to be applied. However, take 1 lb. of white cotton and dye one half black, weighed in small scales; after drying by a moderate heat and allowed to cool, operations may begin by taking any proportionate parts in

ounces or half ounces, as most handy, and forming a mixture of them by means of large hand cards, combing the wool in all directions until an even effect is obtained. No oil must be used with the cotton in this process, which has the effect of deadening the fibre to some extent, and interferes with their free working. After sufficient work, strip off the wool from the cards and flatten as evenly in substance as possible, and then place beneath a cold pressure for some hours. When sufficiently firm, cut into square or round "bats" of about 2 in. diameter, and in the case of gradation of shades, gum them upon a sheet of brown paper in their relative order, from the lightest to the darkest, or vice versa. Of course, when off the same materials and in regular proportions, there should be an equal depth of shade between each sample, and should intermediates be required between any two, it is an easy calculation, in simply black and white, to gain the desired result.

This is a profitable as well as practical exercise, as it is attended by an educational influence as to the distinctive character of the different shades and how each is modified by its contact with others with a contrary complexion, and the character of the ensemble in mutual association. It should be under-

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stood that the brightest mixtures are obtained from black and white when they are pure in their respective compositions, and not changed with exposing hues among themselves, and especially when a fancy shade is added to them, when the latter is better able to render its complementary shade visible among its associates. To illustrate this matter more fully, place a gray thread composed of equal parts of black and white upon a sheet of white paper some 3 in. or 4 in. in length or square, and along the side of it place a red thread, the complementary shade of red being green, the gray will appear tinged with green, or appear as a greenish gray. Again substitute the red for the green in contact with the same gray, and the latter will assume a bronzed appearance, or approaching a brown gray, because reciprocally red is complementary to green. Yellow placed by the side of the same gray will cast its shade of complementary violet upon it, and the reverse by changing the shades in contact and so on with all the primary shades; that is, supposing that the black and white

and fancy colors be pure in their composition, any foreign color be absent from them, which effect the reflection of all. These examples are in accordance with the teaching of M. E. Chevreul, and which may be confirmed by the experiments now referred to. From this it will appear that the successful blending of mixtures for certain effects demands an acquaintance with the science of color, with all the varied influences which heighten or deepen or modify each other when brought into juxtaposition.

For instance, as per the authority just mentioned, a bluish gray will appear still more so when placed in contact with orange because blue is the shade cast off by orange, so that if the gray is not required to be too blue, less blue must be added to the gray when intended to be accompanied by the orange, and the same with regard to other combinations. Although we are now speaking of threads being placed in contact, yet the same principle will hold good with respect to fibres intended for mixtures, that some knowledge is required as to how one and all will

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influence each other in their association. It may be remarked, again, that mere proportions as to weight and length of staple are not sufficient of themselves to determine the kind of mixture for which one is aiming, but that proportions must be governed by the character of the composition desired, the influence of the various factors which are required to make it. It is one thing to produce a mixture from known proportions and given shades by recipe, when all the particulars are the same and from the same lots of materials, which is but mechanical, and it is quite another to concoct a given shade when those particulars are not known, and with different materials, and with no knowledge of the power of colors brought into combination, particularly as to the amount of lively shades to be admitted for an ideal relief. We will give a few examples of pretty mixtures produced by small portions

of fancy colors, which are now represented before us in bats—viz: five parts black, half orange, half crimson; six black, one orange, one crimson; six claret, one orange, one lilac; six brown, one orange; three drab, three brown, half crimson; four white, three brown, half orange, half crimson; three drab, three white, one orange; four white, two drab, one crimson. These carefully manipulated, according to the principles laid down for blending, will produce a range of mixtures of good value, and may be used in many ways, according to design. —*Textile Manufacturer.*

### GERMAN WOOLEN INDUSTRY.

There is probably no German enterprise which has undergone within a comparatively short time such a marked change as the woolen dress-goods industry of this and neighboring districts. Until 1900 prosperous conditions prevailed, but early in that year there was a

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falling off in the values of wool and woolen yarns of from 50 to 60 per cent. Enormous financial sacrifices followed. The high tariff of Russia and the establishment of factories on a large scale at Lodz and other places in that country, the loss of the valuable United States market, and the decrease in exports to Austria, England, and Scandinavia are among the causes of depression. Last year two-thirds of the looms were idle, nor is there any prospect of improvement. Of the many manufacturers previously engaged in the dress-goods trade in our country, only seven or eight are still left, and these ship less each season.

Some of the prominent manufacturers of this and other German cities have established branch factories in Passaic and Philadelphia, and, it is said, with great success.

I am convinced that more would follow, if in possession of the necessary capital. Many communications have been received by this office from real estate agents, railroad companies and private persons in all parts of the United States, wishing to sell property for woolen mills; but, while I may claim the merit of having been the mediator in the partial transplantation of one of the largest Gera factories to our shores, my further endeavors were, on account of lack of capital, in vain.

In my opinion, this is an excellent opportunity for some of our large capitalists to combine with intelligent and reliable European manufacturers in the promotion of home industry. That such an undertaking will prove a first class investment is shown by existing establishments. CHARLES MAUER,

Consular Agt. Gera, May 1, '01.

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By F. W. H.

The Woodcroft tappet, though useful for heavy goods, has certain limitations, the principal one being that the range of patterns to which it can be applied is not large. When the Woodcroft tappet is used for patterns of 16 picks to the round, the motion given to the healds is apt to be somewhat jerky, and the sections of the tappet fre-

quently become loose. The oscillating tappet is a side shedding motion, which, though altogether different from the Woodcroft in principle and working, is positive in action, and directly actuates the healds by means of short levers over the tappet, and long levers over and below the healds, as in the case of the Woodcroft.

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The tappet consists of the requisite number of plates secured together, and in connection with each plate for the guidance of the roller are two roller guides, or duck hills as they are sometimes called. These roller guides are triangular in shape, one angle being fulcrumed on the plate, whilst the other long point guides the bowl up or down. At each side of the plate is an L lever, of which the upper end is connected with the roller guide, and the lower arm of the L lever rests upon the lattice. There are two sets of lattices, each over a barrel, the lattice being arranged with bowls and tubes placed upon spindles according to the number of healds worked and the number of picks to the round. The barrels present the lattices to the levers alternately, all the odd picks being governed by one lattice, and the even picks by the other.

A bowl on the spindle raises the lower arm of the lever, which presses forward the upper end, and so raises the roller guide, causing the bowl on the oscillation of the tappet to pass along the lower side of the roller guide, which thus pulls down the short treadle and raises the heald. Where there is a tube on the lattice the lower end of the lever is allowed to remain down, and the upper end of the lever pressing the roller guide backwards, the bowl is forced along the upper side of the guide, and so depresses the heald.

The tappet is made to rock or oscillate by means of an eccentric cam and strap attached to a wheel on the same shaft on which the tappet rocks. This eccentric cam is connected with the lower end of a vertical lever, the upper end of this lever being connected by an arm with the tappet. The lattice

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barrels are turned by means of star wheels on the ends being moved forward by a stud on a plate. By this motion patterns of a large number of picks to the round may be woven; in fact, the only limit to the number is the ability to arrange for the placing of the lattice. The tappet needs careful setting and attention, otherwise it is apt to be a somewhat expensive shedding motion.

In many mills such goods as light twills and satteens are woven by means of dobby machines, but this is generally considered a somewhat expensive method owing to the wear and tear of a machine that is better adapted to the weav-

ing of patterns requiring more healds and more picks to the round. One of the best motions for these light twills, satteens, etc., is what is generally called the barrel-tappet, such as Smalley's motion. This consists of a large plate wheel with bevel teeth, a series of solid cast iron plates being secured to the same shaft on which the bevel wheel is secured, or, in some cases, these tappet plates are attached to the bevel wheel, and the whole is placed over the loom.

These tappet plates act directly upon one end of a series of double dobby jacks over the tappet, the healds being pulled down by means of spiral springs. Motion is com-

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municated to the tappet by means of a small bevel wheel on the lower shaft of the loom gearing, with a similar wheel on the lower end of an upright shaft, which passes through the yarn and drives the large wheel of the tappet by means of a small bevel wheel on the upright shaft. This upright shaft is, to some extent, somewhat inconvenient to the weaver, but when, as in some cases, the upright shaft is placed near one side of the loom, and a short horizontal shaft is used, the tappet does not always move in accordance with the loom owing to the indirect connection.

Jepson's barrel is very similar in principle, but is arranged so that the patterns woven may be easily varied by means of detachable noses or nugs. One drawback to some of the shedding tappets placed over the loom is the liability

of oil stains upon the cloth. Care should be taken that these shedding motions are properly oiled, but unless they are kept clean the cloth is apt to be occasionally oil stained.

### RED.

There seems to be a great demand for red cloth or serge. Red is not often a happy choice for an entire dress. Much depends on the selection of the shade, however. There is a very soft sympathetic red, like the brightest tints in a red geranium, that brings out the delicate pink and white of the complexion without wrecking them. The great attraction of red (says "Madge") lies in the way it lends itself to braiding. Not even dark blue takes so kindly to this form of trimming as red. Green, the fashionable color, also looks well with military adornments.

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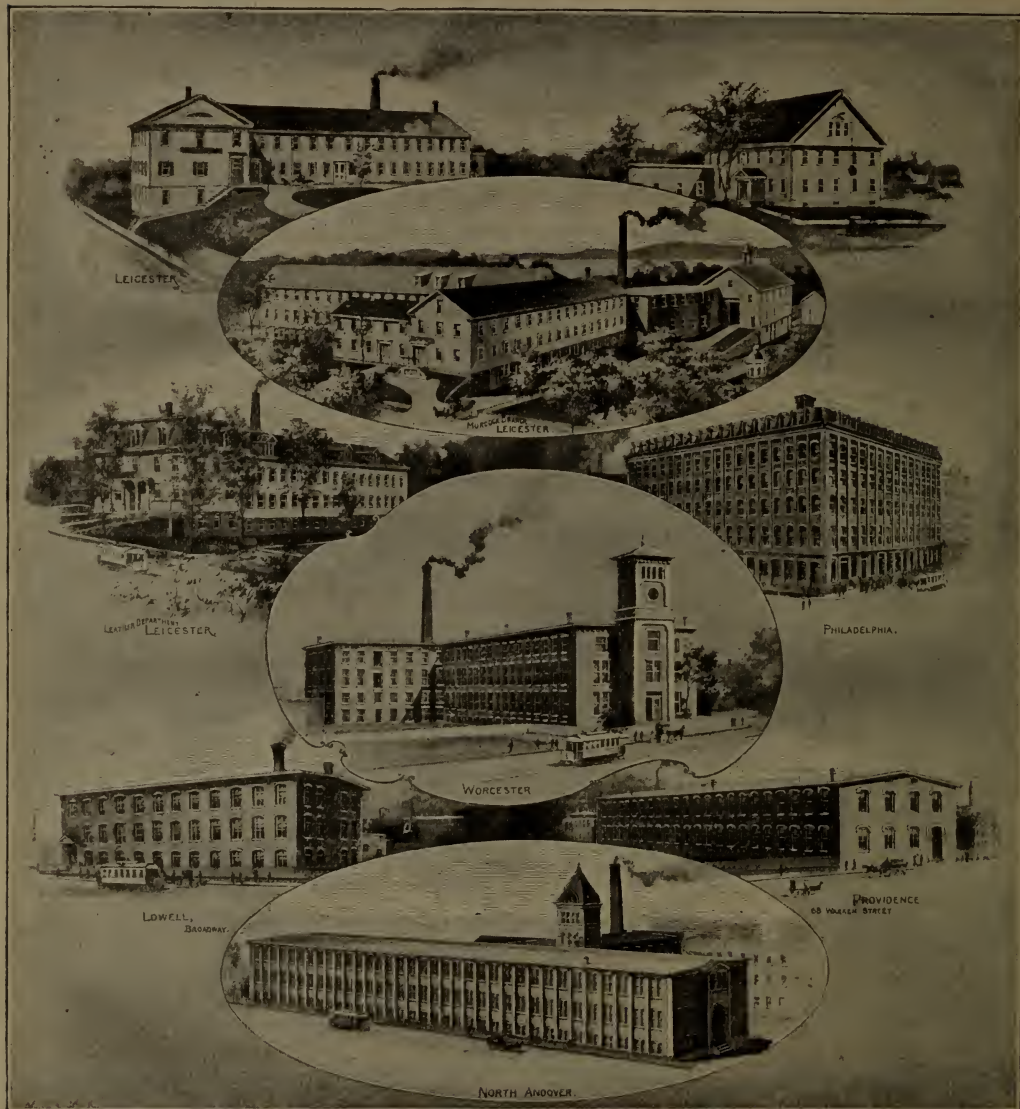


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Journal, and will receive prompt attention.

### EDITORIAL.

To witness the departure of an ocean liner is always an interesting sight; there are many incidents that occur which will ever remain on the memory. Fathers and mothers saying their sad goodbyes to their children, husbands and wives giving their farewell kisses and swearing eternal devotion to each other, sweet hearts whose very

souls are throbbing with love are bidding their adieus.

The morning of the 3rd of July, 1901, was no exception to the rule. The magnificent steamer Commonwealth, of the Dominion line, was scheduled to leave Boston at high tide, 11.30 a. m., and at 12 noon she blew her calitrope whistle. This was the signal for wet eyes, tears and handkerchiefs. There could not have been less than fifteen hundred friends to wish all on board a pleasant voyage, God-speed and a safe return.

The sail down the harbor was very delightful, the sun shining in all its glory, a beautiful clear sky and everything indicating a pleasant voyage.

I met friends on board and we started off on a tour of inspection. The time passed very quickly and pleasantly.

In the evening we had music, reading and singing. Each day in succession was a repetition of the clear, beautiful and brilliant weath-

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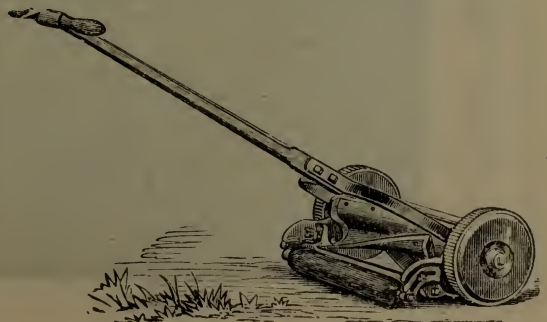
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er, smooth sea and very light winds. There was a little excitement on Wednesday evening when we sighted the coast of Ireland and two hours entertainment in watching the passengers for Queenstown disembark.

We now proceeded on our way to Liverpool and at 4 o'clock p. m. we touched the Princess landing stage.

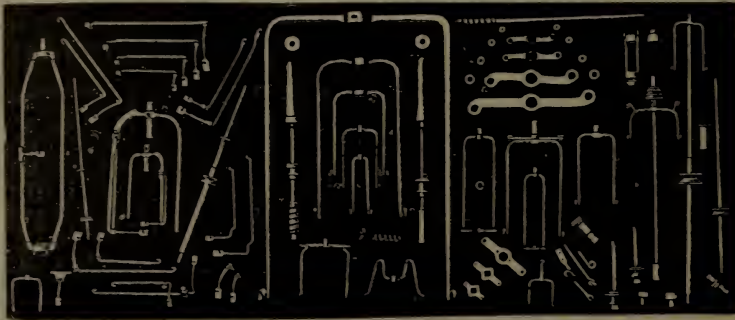
Having stepped ashore our first care was to get our baggage through the custom house. About the only article likely to be in possession of ordinary travellers, on which duty is charged, is tobacco; half a pound of the fragrant weed (including cigars) is usually passed

free of duty, if duly declared and not found concealed. Foreign reprints of copyrighted English books are confiscated. We do not stop at Liverpool until after our return from the north. Memories of the place are chiefly those of a hurried struggle to get from the steamer to the railroad station. A few days, however, may be profitably spent here.

Liverpool bears little of the impress of antiquity. The massive public buildings that we see, the large hotels, the crowded and busy streets are all of comparatively recent construction. It has more the air of New York, Boston or Philadelphia than that of an Old

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World town. The massive warehouses and miles and miles of docks give a striking impression of its commercial greatness. Once a fishing hamlet on a "little creek" frequented by the birds called livers, it is now the queen of British ports with a population of about one million. There is a tone of rest and homelike comfort even in smoky Liverpool; and great magnificence is there, as well of architecture and opulent living as of enterprise and action. St. Georges hall must always command the admiration of even the most hasty traveller. It is in the form of an

immense Greek temple, 600 feet long, adorned with Corinthian columns and many sculptures. Around it also are equestrian statues of the late Queen, Prince Consort and Beaconfield.

One of the things that strikes the American is the double decked horse cars or busses. There are a few trolley cars but their absence is most conspicuous in many of the large cities.

If you wish to appear English you must drop your Americanisms. Don't speak of going down, but up to London, even though you may be travelling south or east. To

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speak of a railway car or conductor would betray you at once; you travel in a railway-coach under the care of a guard. You no longer have baggage, it has been transformed into luggage. It would be quite colonial to speak of a freight train or freight sheds, say rather a goods train or a goods depot. You never go up in an elevator in England, but rather a lift. You hear the expressions as horse trams and electric trams to denote horse cars and electric cars and so on.

The facilities for travelling round about England are not surpassed in any country in the world. The train service is frequent and rapid. Whatever may be said of the American Pullman palace car, those who have had experience of the cosy comfort of an English (first class) coach will think it the perfection of travel. The English trains are quite different from ours.

The engines are smaller and have a sharp, shrill whistle; the ordinary coaches, which are much lower and shorter than ours, are divided into smaller compartments with no communication between them. Each compartment is about seven feet high, six feet from front to rear and extends the width of the coach with seating capacity for ten, five on each of the two seats, which face each other. There are two doors in each compartment, one on each side. The train can consequently be filled or emptied in a short time. The compartments generally are of six grades: first, second and third-class for non-smokers, and first, second and third-class for smokers. The coaches are not heated, and in cold weather travelling rugs and warming pans are called into service. One noticeable feature is that there are no news agents on board sell-

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ing papers, magazines, and prize packages of candy etc. Those who desire these articles can purchase them from the coach window at most of the stations. In like manner the guard does not, in fact cannot, go through the train, and just as you are composed for a quiet snooze, ask to see your ticket. Tickets are examined at a few stations by station officials, and are not collected by the guard, but are given up as you leave the station at which you get off. The trains which make long runs have what are called corridor coaches, in which the compartments do not extend the whole width of the coach, whereby a narrow corridor is left extending the whole length of one side of the coach. Most of the cars for carrying goods are open and very small, the merchandise being protected from rain by oil cloths stretched over them and can

be compared to the American railway construction dump cart.

We had a compartment all to ourselves and enjoyed our ride very much. I was forcibly struck by the great confidence placed by the railroad company in its patrons. We telegraphed on ahead for a lunch, giving the number of our compartment. When we arrived at the station we found a boy waiting for us with three well filled hampers, with knives and forks and other implements of warfare ready for service. The train started and we ate our lunch at our leisure, and were requested to leave our baskets in the coach. I am afraid that in the United States there would have been a great loss of cutlery, and that in some instances even the baskets would be missing. The Americans are great collectors of souvenirs.

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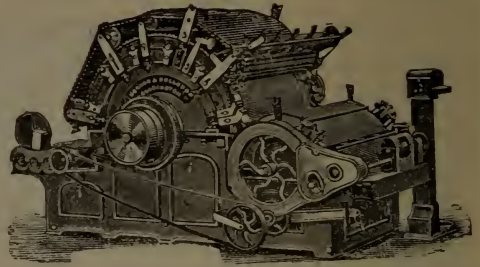
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the merits and you will be convinced beyond a doubt of their superiority.

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## GLEANINGS FROM CONSULAR REPORTS.

### COTTON CULTURE IN HUNGARY.

Consul Mahin, of Reichenberg, under date of April 22, 1901, reports

It is intended this year to essay the cultivation of the cotton plant in Hungary. It is said that it will ripen in the southern part of that kingdom; the efforts to grow cotton in the lower provinces of Asiatic Russia, in the same latitude as Hungary, have been successful. It is probable that bounties will be paid the cotton planters, in keeping with Hungary's liberal treatment of the founders of factories. More or less success is now attending the culture of cotton in Spain, southern Italy, Macedonia, and Malta.

### ORIENTAL CARPET TRADE.

Consul Hughes reports from Coburg, May 4, 1901:

The preference shown by Europeans and Americans for oriental carpets increases each year. For three or four years, the prices have risen 25 to 30 per cent, and for certain kinds, even 50 to 60 per cent. This rise is not due so much to the increasing demand as to the fact that the old carpets are becoming more scarce, and, as those of modern manufacture are very imperfect, they will not be replaced by new ones equally as good. Of the modern carpets, only the large ones from Asia Minor (Smyrna), the Persian (particularly the Kirmans),

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WORSTED**MACHINERY**CARD CLOTHING,  
EGYPTIAN COTTON, Etc.

some from Afghanistan, and the small but carefully worked Merws are very much sought. The small ones from Caucasia and Central Asia do not meet with particular favor. The time is not far distant when the old carpets will all be bought up, and it would be advisable for some worthy collector to obtain samples of the still existing old carpets and place them in one of our well-known museums.

**GERMAN TECHNICAL BUREAU.**

Deputy Consul General Hanauer writes from Frankfort, May 18, 1901:

Steps are being taken for the creation of a federal bureau of technics in Germany. On the executive committee having charge of this plan are members of the leading chemical works, the German association for protecting the trades, the Technical association of Germany, the Association of German Engineers, the Union of

German Patent Lawyers, the Central Bureau for Scientific Investigation, the Institute for Fermentation, the German Tobacco association, electrical companies, and others.

**COTTON GOODS FOR BRAZIL.**

The following translation from the Berlin Handels Museum has been received from Vice Consul Murphy, of Frankfort, May 4, 1901:

In Bahia, cotton drills (plantation stuffs) are chiefly from Italy or from factories in Brazil. An Italian stock company has factories for this material in Milan and also in Sao Paulo, as well as a branch establishment in Bahia. It sends its salesmen through the interior of Brazil. Cotton shawls for women are supplied by Germany. These articles are now also being manufactured at Bahia. Cotton calicoes and fancy stuffs are furnished chiefly by Great Britain. The demand is principally for the

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cheaper sorts. Cotton tourists' and laborers' shirts come from Germany. The demand has recently very much increased, and sales are accordingly of growing importance.

**AN ANCIENT ADVERTISE-  
MENT.**

The following amusing document appears in Mr. Baring Gould's "Memoir of the Rev. S. Hawker." It is given as a specimen of English composition by a schoolmaster of the old style in Devonshire, who had written it as an advertisement for a little shop:—"Rodger Giles, Surgin, Parish Clark, and skulemaster, Grocer, and Hundertaker, Respectably informs ladys and gentlemen, that he drows teef, without waiting a minit, Applies Leeches, every hour, blisters, no the Lowest tarms, And Visicks, for a penny apeace. He sells God-

fathers, Kordals, Kuts Korns and bunyons, doktors hosses, clips donkies, wance a munth. And undertake to look arter every bodies Nayles, by the ear (year). Joscharps, penny wissels, brass candlesticks, frying pans, and other moosikal instruments. Hats, grattly redused in figers, Yong ladys and gentlemen, larnes, their grammer, and langeudge, in the purest manner also grate, care taken off their morrals, and spelling, also Zarm, Zinging, Squadrills, pokers, weazils, and all country dances, tort, at home and abroad at perfekshun. Perfumery, Znuff, in all its branches, as times is cruel Bad I begs to tell yea that I his jist begannd to sell all sorts of Stashonary, Ware, Sush as Cox, Hens Vouls, Pigs, and all other kinds of Poultry, Blakin Brishes, Herrins Coles, Skrubbin Brishes, trakles, godly Bukes, and Bibles, mise traps, Brick Dusts,

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and Wisker seed, Morrel pokker henkerchers, and all kinds of swate mates, includin taters, sassage, and other garden stuff. Bakkey, Zig-gars, Lamp oyle, taykettles, and other intoxicatin Likkers, a dale of frute on hand such as Hats, Zongs, Hare Oyle, Pattins, Bukkets, Grindin stones, and other aitable, korns, and Bonyons, Zalve, and all Such hardwares, I as lade in a large azzortment, of trype, and dogs mate, such as lollipops, ginger-beer, Maches and other Pikkeles, such as Epsum Salts, Hoysters, Winzer soap and zetra. Old rags, bort, and zold here, and nowbere else, new lade eggs, by me Rodger Giles, Zinging, Burdes, kepted, such as howls, donkies, Paykoxs, lobsters-crickets, also the stock of a Zele-

brated breyder. Agents for selling guttas, Porker souls. P—S.—I Tayches Gografy, Rithmaticks, Cowsticks Rumaticks, Gimnasticks, and other Chynees Tricks."

R. S, Hurst Brook.

Quacks are stubborn things.

It's a wise girl who knows her own mind.

Society's the mother of invention.

Home was not built in a day.

Modesty is the best policy.

Circumstances alter faces.

A rolling gait gathers no remorse.

All's not old that titters.

Let us eat, drink, and be married, for tomorrow we dye.

Charity uncovers a multitude of sins.—CAROLINE WELLS, in *The Smart Set*.

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The only satisfactory working machine made for pressing cloths, etc., to give a handsome finish which the goods retain. ~~Re~~ Repairing promptly attended to and all work warranted. Address

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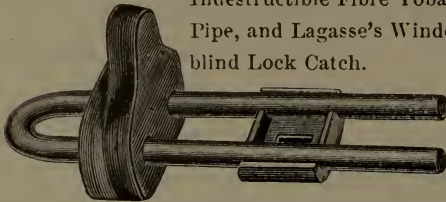
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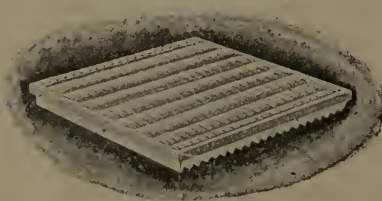


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### FUNGI AND THEIR GROWTH—A VALUABLE INDUSTRY TO BE BUILT UP.

Dr. A. J. H. Crispi contributes to the August number of "Chamber's Journal" an article giving interesting facts about fungi. He points out that there are at least 4,000 species of fungi to be found in the United Kingdom. They grow almost everywhere—in houses, on wood, in the closed cavities of nuts, in animal tissues—in short, in and upon everything. A blacksmith at Salem threw on one side a piece of iron which he had just taken from the fire, and next morning he found on this piece of metal, lying over the water in his trough, a fungoid mass two feet in length. It had crept from the iron to some wood near, and not from the latter

to the iron; and this immense mass had formed in twelve hours. The late Rev. M. J. Berkeley, F. R. S., saw a species of fungus on a lead cistern at Kew, and Sowerby found one growing on some cinders on the outside of the dome of St. Paul's Cathedral. The great puff-ball will reach the size of a pumpkin in a single night, and Lindley calculated that the cells of which it is made up will multiply at the rate of sixty millions a minute. The late Dr. B. Carpenter recorded an instance of the tremendous power exerted by growing fungi. Many years ago Basingstoke was paved, and some time afterwards the pavement was found to be uneven; this in-

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creased until some of the heaviest stones were completely lifted out of place by the growth of enormous fungi underneath. One of these paving-stones was 22x21 in., and weighed 83 lb. Dr. M. C. Cooke had a similar incident brought under his notice—a large kitchen hearthstone being forced out of its bed by the growth of a fungus.

OPENING FOR A NEW INDUSTRY.

Sir Joseph Banks relates a still more startling occurrence. A cask of wine leaked and after a time a fungus grew from the leakage, finally filling the cellar and lifting the cask to the ceiling. The writer continues:— Fungi, like human beings, give off carbonic acid and not oxygen, as do other vegetables. This is due, probably, to the absence of green coloring matters. A curious error is to suppose that fungi are eatable and toadstools poisonous. There is no such line

of demarcation; nor, strictly speaking, has "toadstool" any precise meaning. Very many fungi are eatable, the number of poisonous varieties being greatly exaggerated. The common agaric, usually eaten in England, is not the most palatable and wholesome; indeed, in Italy it is said it was at one time condemned and not allowed to be sold in the fungus-market, which is there quite an institution; but this assertion is a traveler's tale. Few foods are more savory and greater favorites than well-cooked fungi, and vegetarians long for them. And no wonder! They have the reputation of being very nutritious; but physiologists say this is a mistake and there is reason to believe that a given weight of them is not as sustaining as, from its chemical composition, it ought to be. This does not mean that they are not useful adjuncts to food, and as flavoring ingredients

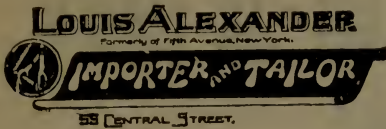
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they have no superiors. Far greater use of them ought to be encouraged, and I cannot see why the supply of fungi should not be increased twentyfold, and in this way a most valuable industry might be developed, or, more correctly, built up in our midst.

#### *IN THEIR OWN LANGUAGE.*

A well-known bishop was one day being driven in a cab to St. Paul's, when he was shocked to hear the driver pouring forth a regular torrent of bad language upon a brother jehu who was coming along on the wrong side of the road. On arriving at his destination the divine expostulated with

his coachman. But he could not help smiling when the man answered: "Well, sir, I was reading a speech of yours the other day to some divinity students, and you hurried 'em to always speak to people in their own language, and that's what I was doing, your worship."

Niece—"Oh, uncle, I've dropped an egg."

Irritable Uncle—"Then, cackle, madam, cackle!"

Mr. Kelly—"There's a mon and his woife fighting up on the sixth flure!"

Officer Rooney—"Well, phwat of it? Oi can't shtop people from getting married, ye fule!"

## **ALL ABOARD FOR BUFFALO!**

The next low priced popular excursion to the Pan-American for \$27 will leave Lowell Monday, Sept. 16th. Giving a side trip to Niagara Falls, with beautiful carriage drives around Goat Island, and three sister islands, also the wonderful Gorge Route, in observation cars of 23 miles, along the Niagara River, with dinner at the Imperial Hotel. Full particulars by calling or writing to A. L. Russell, 407 Middlesex street.

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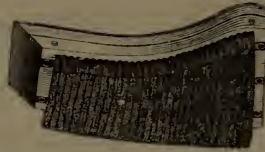
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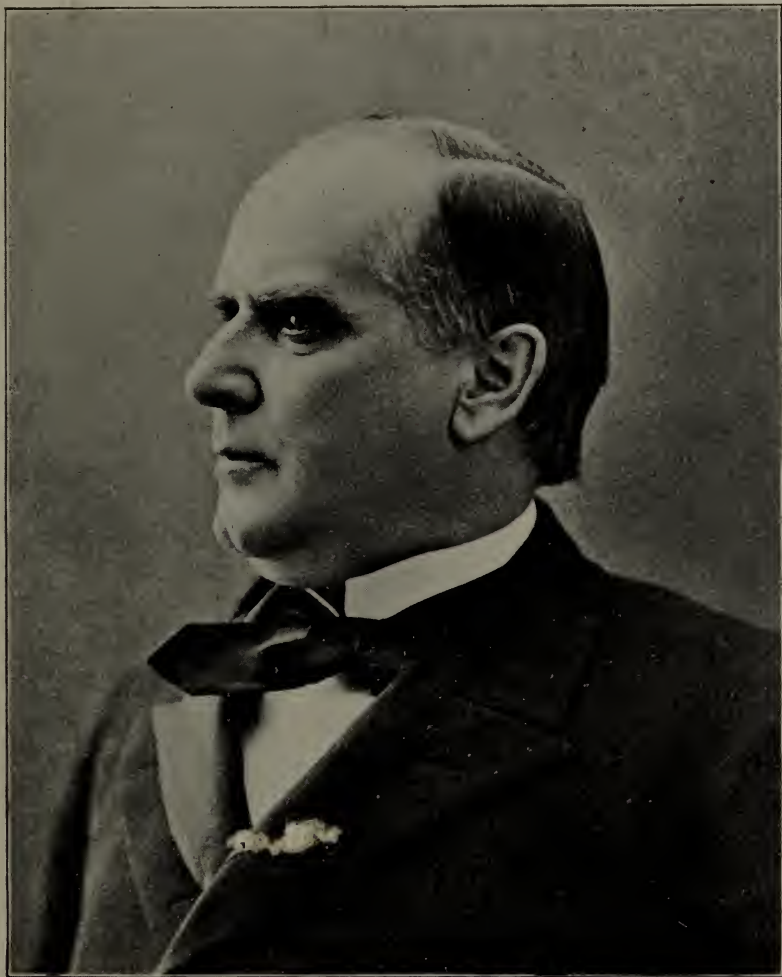
LOWELL, MASS.





# Lowell Textile Journal

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THE LATE PRESIDENT WILLIAM McKINLEY.

## CLOSING SENTENCE OF PRESIDENT McKINLEY'S LAST SPEECH.

Our earnest prayer is, that God will graciously vouchsafe prosperity, happiness and peace to all our neighbors, and like blessings to all the people and powers on earth.

Let us ever remember that our interests are in concord, not in conflict; and that our real eminence rests in the victories of peace, not those of war.

## PAN AMERICAN EXHIBITION, BUFFALO, N. Y.

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(From Our Correspondent.)

To tell your readers of everything worth seeing in the exhibition, would require more space in your magazine than you can well afford, but it is well for them to know where to look for that which specially interests textile students.

I have been spending some time today in the Manufacturers and Liberal Arts Building; at the northeast corner is an enclosure devoted to subjects, educational, social and economic. This enclosure is divided into several sections, and in one of them is the exhibit of the Lowell Textile School. The exhibit consists of a case of power loom weaving, one of hand loom weaving and two cases of yarns, besides two small shelves of chemicals made by students of the school, and an exhibit of wall paper designing. The whole exhibit is unique, inasmuch as it shows, and is *the only one to show the production of cloth from the raw material to the finished product*. These exhibits are not only useful in showing what the Lowell school can do, but also serves as a revelation to many who did not know that such cloths

could be made in this country. A wealthy manufacturer from one of your New England states, said you were to be congratulated on the work you are doing.

The Lowell Textile School finds itself in good company, close by is the exhibit of the Philadelphia School of Design for Women, apart from specimens of paintings and drawings made by the pupils are designs for wall paper, prints, tableware and under-glaze. Especially interesting are the exercises in conventionalization of color combinations arranged in cotton dress plaids, showing weave and drawing draft and harness draft.

The Pratt Institute of Brooklyn shows many things which are of interest to your readers.

The Worcester Polytechnic Institute, among other things, shows a beautiful case of chemicals, showing rare care in manufacture and crystallization. The exhibit of the Washburn shops are worthy of attention, so also is the work being done by the Rochester Mechanics Institute and Athenæum. The work done by the School of Industrial Art, Pennsylvania, will

especially interest your young designers. They display designs in oriental rugs, swiss silk, gingham, shirting, cretonne, brocade, prints and wall paper, stained glass windows and interior decorations.

The School of Industrial Art for women of New York, has the best display, as it shows the progress made by individual pupils. The work shown comprises working designs and fabrics and sketches for Moquette, five-framed body Brussels, line cloths and oil cloths. I am sorry that I have not time to specialize more fully, but enough has been tabulated to show that there is enough to interest the manufacturer of textile material.

At the time of writing the above the gloom and sorrow which was cast over the Pan-American Exhibition by the dastardly attempt on the life of President McKinley was temporarily being lifted. There was hope of his speedy recovery. I shall never forget the day when the dreadful crime took place. I was in one of the buildings at the time when a boy came rushing up to me saying, "the president has been shot." Of course I could not believe it. No one could believe that such a thunderbolt could be shot from so clear a sky. What, the president, our guest, so welcome, and so glad to be welcomed, shot? Impossible! Alas it was

too true, something magnetic in the air said it was true, something touched the heart and said it was fatal, out in the grounds where men and women gathered to hear the account of the tragedy from eye witnesses. The dreadful news by some unseen messenger had been carried all over those vast grounds, strong men wept, and women fainted. The love which the people bear for their president was everywhere manifest. Down South or out West the villain who dared to perpetrate such a deed would have been lynched, but here the grief was so sudden and so overwhelming that happily the thought of resorting to such means occurred but to a few. The very heavens, which during the president's visit seemed to beam on him with joy and satisfaction, have since taken on a sombre hue, as if in sympathy with a sorrowing nation. With what joy the people read the daily bulletins, the president has gone through a successful operation, the president has had a good night, the president has talked and joked with the doctors. Every one was congratulating every one else that the president was out of danger. Then after so much hope, to have it all shattered. The president is dying. On the night of the 13th at 8 p. m. the Exposition closed and the crowd from there congregated in



the vicinity of the newspaper offices waiting for news. Somewhere about 11.30 some papers announced "The president is dead." Then with bowed heads and aching hearts the people wended their way home, but it was not until 2.15 of the 14th Sept. (a date ever to be remembered) that he passed away. All through the night until daybreak, it seemed as if the thick misty air was vibrating with the cry, "The president is dead." On Saturday and Sunday the Exposition shut its gates to the public. On Sunday, after a short but most touching service at the house of Mr. Milburn, the president of the Pan-American, the body was taken in procession through Delaware Avenue, one of America's most beautiful avenues to the City Hall. At

1 o'clock the people were permitted to view the corpse. They were admitted in two lines, and in couples. The constant stream lasted from that time until 11.30 at night, and it is estimated that 100,000 people passed through the City Hall to pay their last tribute of respect to their dead president. It is not my intention, neither have I the ability to touch on the past life of President McKinley, your readers all know that his whole life was given to his country, as soldier and statesman. Perhaps there are no others so vastly indebted to him as the manufacturers of textile fabrics, first by his celebrated McKinley bill and later by his wise policy of protection.

WILLIAM HENRY UMPLEBY.

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## WORSTED SPINNING—Continued.

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This survey is important as showing the general influence of temperature. It must, however, be pointed out that there are extrinsic agencies which cause local variations, and these sometimes render a certain small area peculiarly suitable for wool growing, while another is just the opposite. Tem-

perature can only be regarded as a factor in the sequence of agencies which affect the wool, and it does not always seem to exert the same influence upon all classes of sheep. Those which inhabit hot countries have a tendency to produce hair instead of wool, and numerous instances have been recorded of

the change produced in the fleece when sheep have been removed from one district to another having a different temperature, still, in the merino, which has been taken to Australasia, Sweden, America and other countries no very great change in its essential features appears to have occurred. In Venezuela, however, unless it is regularly shorn each year, the fleece becomes stronger and more hairy. While it is difficult to precisely define the influence exerted by temperature, it may be said to act in two ways—first, it partially determines the type or quality of the fleece produced, as seen in the case of Australia, Asia and Britain, and second, upon its influences, the soundness and regularity of the staple largely depends, so much so, that often means are taken to prevent the sheep being exposed to wide and sharp variations. Since the fleece, which is a part or modification of the skin for the protection of the animal, derives its nutriment directly from the blood, anything which affects the sheep is shown by the wool. Experienced observers can readily tell from an examination of the wool how the sheep have been treated between the seasons. The condition, thickness, density and texture of the skin, which are, strictly speaking, determined by the conditions

to which the animal is subject, climate, etc., regulate the character of the fleece. A thick, strong skin, such as is caused by exposure and neglect, cannot yield fine, sound wool, its elasticity and sensitiveness is impaired, the muscular and elastic tissue seem to lose their responsive action, and cease to exercise their pressure and control upon the wool, hence it becomes coarse and hairy. A good illustration of this is seen in the occurrence of Kemp's, which are fibres that retain all the rudimentary peculiarities and have undergone no modification. The finest wool is produced by the upper layers of the skin, but if these be permanently affected by changes of temperature, the development of the stronger fibres in the lower layers follows to afford the necessary protection. As mentioned, the substance required for the formation and growth of the wool are furnished by the blood which circulates through the numerous small capillaries in the skin. The quantity of the blood which they convey is largely dependent upon temperature. Under the influence of cold it is restricted, flowing away from the skin to the heart, this, together with the contraction which also takes place, has an injurious effect on the wool, causing irregularity, i. e.:—thin or tender places due to a de-

iciency in the supply of materials required for growth, and the pressure exercised on the fibres by the contraction of the skin. A comparison of the isothermic lines showing the relation of the wool-growing countries and the districts having an equal annual range of temperature seems to indicate that when the variation exceeds  $30^{\circ}$ , wools of the merino type do not succeed, and where the difference is over  $40^{\circ}$ , as seen in the Asiatic countries, the fleece often consists of an admixture of fibres, exhibiting every phase of development and modification from extremely straight, long and coarse hairs to an undergrowth composed of very short and fine fibres, of which the cashmere is a good example.

The rainfall and humidity of a district have an important bearing upon the quality and character of the wool which it yields. The fine wool-producing districts are notorious for their scanty rainfall and the frequent occurrence of prolonged droughts, which in the inland parts of the eastern portion of Australia, are apparently periodical, and as far as can be ascertained occur at

regular intervals, and sometimes last for two or three years, during which little or no rain falls. Australia, as a whole, furnishes a good illustration in the districts near the coasts and in the vicinity of hills and mountain ranges, where the rainfall is the highest, the stronger varieties of wool, such as the cross-bred and the pure English breeds succeed best and yield a fleece of excellent quality, while in the inland districts, which are exceedingly dry, the rainfall being only a few inches, the merino flourishes and yields its best and finest varieties. The difference is well shown by a comparison, thus: Sydney, on the coast has 50 inches; Bathurst, 23; Wentworth in the Darling district, 500 miles inland, has 14; the Western Plains, bordering on South Australia, only 8 inches; these two latter districts are noted for their wools, which are very fine, soft and silky. The Colony of Victoria, whose wools on the average are slightly stronger and more lustrous than those of New South Wales, the rainfall is somewhat higher in the growing areas,

---

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though very uncertain and periods of drought are prevalent. Melbourne has 25 inches, Ballarat, an inland town near the range of mountains, twenty-seven; Bendigo, twenty-two, and Echuca, a town at the extreme north, eighteen inches. In the Mallie, situated in the Mimera district, the average is from fourteen to seventeen inches. South Australia, which supplies the Adelaide wools, has a rather heavier rainfall in the wool district, varying from eighteen to twenty-four inches, its effect is seen in the fleece, which is both stronger and coarser than the Sydney or Port Philip. Evidence seems to show that districts whose annual rainfall is not over twenty-four inches, are most suitable for the merino; where this is exceeded the wool acquires to a slight extent some of the features peculiar to the shorter types of the cross-bred variety. In South Africa the features are something

similar. At Graaf Reinet the average for twenty-three years is 14.5 inches, while for eight stations in different parts of the Karoo district the average is only 9.6 inches. The grass districts have a rather higher rainfall, thus at Richmond the mean for thirteen years was 12.8; Colesburg, for fourteen years, 15.5, and at Aliwal North for twenty-five years 25.2 inches. No record available for South America, but we may safely say they will approximate closely to those given. Mountainous and hilly districts generally have a high rainfall, which has an important influence on the wool, making it dry, harsh and heavy, partly owing to the natural grease being washed out of the fleece, as seen in the Scotch and Moorland wools. An exception in this direction must be remembered in connection with some of the Asiatic countries, the mountain ranges here are amongst

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the most extensive and highest in the world, but yet, in some instances we have exceptionally dry areas, due to the influences of the prevailing winds.

It does not necessarily follow that a district with a small rainfall is dry, on the contrary it may be very moist, owing to the humidity of the atmosphere, while another with a heavy rainfall may be comparatively dry, owing to the porosity of the soil. Lincolnshire is a good illustration of the first. Here we have a wool typical of a moist district, and yet it is one of the counties with the smallest rainfall in England, but owing to the marshy character of its soil, the humidity is very high. When combined with a small or normal rainfall, we have a sandy, open

soil, then the area is very dry and the humidity very low, owing to the water draining very rapidly away, as seen in the case of Australia and Cape Colony.

A dry climate is essential for the growth of very fine wool, moisture causing it to become stronger, hence the humid character of Britain is not suitable for the merinos, whilst its medium wools are unsurpassed. In a humid atmosphere the skin is relaxed, it is moist and elastic. Under these circumstances the innumerable orifices which are distributed over its surface are, comparatively speaking, large, and favor the development of a wool strong in fibre, and since the sheep inhabiting these districts are large, well built animals, they yield a fleece of

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a corresponding character, remarkable for its deep growth and strength. In the districts with a low humidity the opposite features prevail; the extreme dryness of the atmosphere is most suitable for small sheep, other features being favorable with a thin, close, highly organized elastic skin, in which the pores are small and contracted as in the merino. Humidity, rainfall and temperature are all factors whose influences are very closely co-related and exceedingly powerful in modifying and controlling the growth of wool, either injuriously or beneficially.

The nature of the soil and the character of the herbage it yields are two most important factors. For fine wools a light, porous, sandy or chalky soil is essential, dryness and warmth are the attributes which are necessary. A heavy, cold, wet clay soil favors the growth of long, strong-stapled

wools of the Lincoln type. It is well known that a light, dry diet, such as rye and barley straw produces a much finer and better wool than is obtained from the succulent and richer foods, like turnips and oil cakes. On the continent a considerable quantity of straw and other dry foods in conjunction with protection from variations of climate, is the procedure adopted for improving the wool. Heavy feeding and fine wool are incompatible, this is well illustrated by the results obtained where the system of paddock feeding is followed. I am indebted to Mr. Herman Schmilt for an illustration upon this point, he says: "A gentleman in Australia, whose flocks were shepherded, had succeeded in establishing a good name for their wool, it was short, fine in the fibre and silky. He fenced his land and allowed his sheep to run loose. When the first clip of his

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paddock-fed sheep had been sold, his brokers inquired why he had gone in for so different a class of sheep as those which realized such good prices. The wool had grown so much longer and coarser during the time of paddock feeding that the clip appeared to have come from a different stock of sheep." Prof. Rhode made numerous experiments to ascertain whether the length and growth of the wool fibre is materially influenced by the system of feeding. The results have shown that the length and coarseness increases in proportion to the amount of nourishment consumed in excess of the ordinary demand, the fleece becoming the store for much of the digested food

not required by the processes of growth or development of the carcass. Where the merino flourishes the herbage is so short, dry and scanty that no other type of sheep could succeed. The composition of the soil requires consideration in case of fine wools, a year's growth, extracts more potash from the food than the carcass requires during the whole existence of the sheep. The chief reason why some districts previously noted for the superior quality of their wool have degenerated is because of the exhaustion of the soil, and when the sheep are taken to a new district they regain their features. They are deficient in potash, and in parts of Australia the sheep

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have been known to travel long distances to lick the bones of animals that have died and their skeletons been allowed to remain. The wool from a new district known as "blue wool," where the herbage has been burnt off before the sheep are put on to it is always of good quality, because of the potash derived from the plant ashes, is in such a form that it can be readily assimilated by the growing plants on which the sheep feed. In the colonies where deterioration arises from this cause, in the case of lands where sheep have been reared for a long time without any return being made, a dressing of potash would prove exceedingly beneficial. The sharp handle exhibited by the South Down wool is attributed to the soil, which is of a chalky nature. Particles get associated with the fleece, which by their corrosive action and combination with the na-

tural grease by which the fleece is protected, makes the fibres somewhat harsh. Bakewell has a good illustration upon this point, he says: "In parts of Derbyshire the arrangement of the mineral strata is often so abruptly broken, that two adjoining farms separated by a small stream, would be frequently found one situated upon a limestone and the other upon sandstone or millstone grit. The difference of the wool on these two farms, from the same breed of sheep, and particularly with regard to its harshness or softness, is so distinctly marked and well known, that the farmer would obtain one shilling to one shilling and sixpence per tod more for his wool when grown upon the latter soil. The soil often imparts a distinct coloration to the fleece. Upon this question Mr. Wright, the eminent breeder of Lincoln sheep, writes that in Lincolnshire and the adjoining

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counties we have many different classes and colors of soil, and naturally as many different colors of sheep. For instance, upon his farm the fleece is always of a darkish color from the sandy character of the soil, while upon his brother's farm, situated on the high chalk wolds, the sheep are pure white. In South Lincolnshire, owing to the strong nature of the land, the color is of a darkish gray, while in the fens, where the soil is black, they assume a still darker hue. To overcome this diversity of color, recourse is frequently had to artificial coloring in order to secure uniformity in appearance.

Altitude and contour must also

be mentioned in connection with the agencies just considered, since the have great influence in determining the climatic conditions which prevail. The sheep is essentially a mountainous animal, yet so far as the fleece is concerned, it reaches its highest development in the lowlands, as seen particularly in Australia, which has a low altitude, and also in the River Plate district. Cape Colony has a greater elevation, averaging about 3000 feet, and probably this is one of the reasons why the Australian merinos deteriorate somewhat when taken to South Africa, and may also to some extent explain the success which has attended

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During its growth the fleece becomes impregnated with different impurities, derived from various sources, which have to be removed before the wool can be successfully worked up into a thread. Their removal is one of the initial processes of manufacturing, and if not properly accomplished, causes trouble in the succeeding operations. They vary considerably, but for convenience they may be classed as natural—i. e., those impurities derived directly from the sheep, consisting of secretions and excretions from the skin, which play a very important part in the economy of the fibres—foreign; those impurities derived from the surroundings, comprising animal, vegetable, mineral matters and

moisture in the form of dung, fodder, fruits, seeds, twigs, sand, etc. The percentage and nature of these foreign impurities varies in different varieties, and also in different parts of the fleece, some being much worse than others. The climatic conditions and character of the surroundings amidst which the wool is grown influence the quantity, hence the same type or brand, varies from season to season, in the amount it contains, thus a very dry season causes an excess of sandy or earthy matter. Sometimes the sand gives a characteristic color to the fleece as seen in the Adelaide and Swan River wools of Australia, which are distinctly red. Chalk or lime when pressed, has a tendency to produce a hardness or sharp handle as seen in the South Downs.

*To be continued.*

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## EDITORIAL.

There is, perhaps, no question in the whole course of textile manufacturing which is asked with so much earnestness and usually receives so meagre a reply as that from the young man who asks: 'How can I become a designer?' In nearly every case, the young man asking this question feels that the circumstances which surround him are such as to absolutely forbid

the idea of his attending any of the designing schools, and in his despair of finding any way himself, he turns to the editor of some trade journal. Too often he is told to read such and such book, regardless of the fact that the reading of no one or a dozen books, or a hundred books will make him a designer.

As one who has been forced, through poor circumstances, to get nearly all of his knowledge of designing without personal assistance from anyone, it may not be out of place here for us to outline such plans as have been of the most help to us. The best kind of literature on designing of today are the trade journals. Let the young man who wishes to become a designer, subscribe and pay for two or three of such journals as have a special bearing upon what he wishes to learn.

We say pay for it because there is a moral influence in paying for what he is getting that will cause him to obtain more real information from journals so obtained, than

HEADQUARTERS FOR

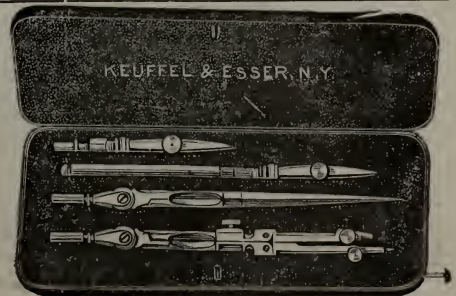
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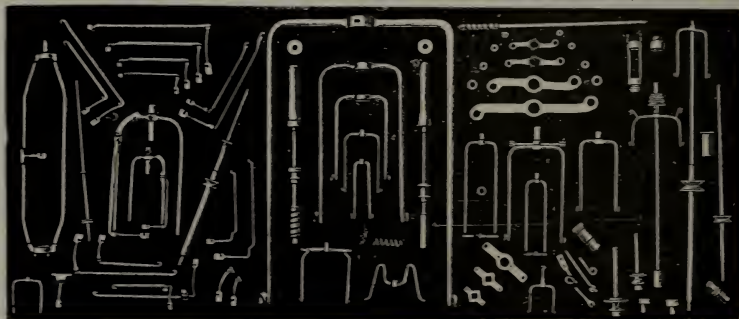
from a dozen which may be given to him. Each number should be read carefully and every article studied so thoroughly as to be certain that there are no points but what are understood; if there should be points not understood, ask questions about them. Nor is this all; each statement made should be carefully compared with his everyday experience, and when items of information appear to have no direct bearing on his present surroundings, he should enter upon experiments or carefully retain the remarks until such time as he can prove them to the contrary. It is by the careful comparison of others' statements, one's own practical experience, that the best and fullest

knowledge of designing comes. Books, to be sure, on various subjects are also of great advantage to the beginner; in fact, they become a necessity to a certain extent, if he wishes to develop his mind with the idea of another in the designing art; but as a great number of minds are wiser than any one mind, so is the trade journal, which is the reflex of many minds, better than the book, which is the reflex of only one mind.

Looking on the practical side of the question the young designer should study carefully the class of goods with which he comes in daily contact. A long time spent in studying a single pattern may seem like a waste of time to him, but if he

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thoroughly understands one pattern he has travelled a long road toward the comprehension of many others. By the understanding of a pattern is meant, not only understanding how it was woven but how it was made in general, the sizes of yarn, the number of threads in warp, picks per inch, stock, proportions of mixes if used, and general arrangements in its construction. If this work be studied and faithfully carried out without the assistance of any one it will be of vastly more benefit to him than anything he could learn in a school. Having extracted all the information pos-

sible from the first pattern, let him take another of a somewhat different class or style and go through with it in the same way; a comparison of the first pattern with that of the second will give him some idea of the latitude that has to be experienced by designers. If the beginner has the true designing instincts, this investigation will have an absorbing interest to him and he will see a wide field of thought opening up before his mind, which in after years will bring forth good results.

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in all places. Remember that one hour of earnest thought upon a subject on which you have been reading is worth ten extra hours of reading upon it. The designer who will persistently "study" and "think" on his business, will not down. He will certainly come to the front even though he has many jealous opponents working against him.

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### *FINISHING—No. 1.*

By MOSE.

Those who are best acquainted with the subject, will, in some degree, understand why it is not an easy task to write upon finishing. In the first place, different finishers have different methods of arriving at similar results, so that the ideas of one might not be in accord with those of another. The writer does not claim superiority in the methods of work, nor that there are no other methods better: but he does claim that his methods have proved of value to him in the past, and trusts that the facts he gives may be of interest and benefit to some of the younger men who are starting to advance in this particular branch of woolen manufacturing.

Another difficulty that we meet in treating of this subject, is the fact that different kinds of goods, together with the varied conditions

and circumstances under which the work is done, render it quite impossible for anyone to rely upon any specified rules, even when handling one class of goods, and a variety of goods render it still more difficult to settle down upon any prescribed manner of work. Hence it will be seen that there is a demand for a variation in the manner of doing the work, and it would be impossible to discuss all these variations, and above all, to present all the ways and wherefores that the subject would present.

The practical finisher deals with these variations as they come to him, and they belong to the detail of the work; and some things that would call for his attention today, might not exist tomorrow, and what one piece of goods would demand, might not be required of another; so that to enter very fully into the detail of the work, might be as likely to mislead as otherwise. However, there are certain general rules and principles which may be relied upon, subject to such variations as the circumstances may re-

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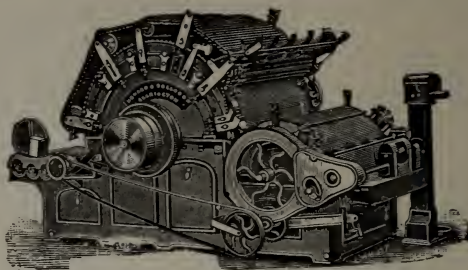
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quire. The general principles involved in finishing are necessarily broad enough to allow the practical man to adopt his manner of work to the kind of goods, and the circumstances that attend them. To do this requires some practical knowledge, as what would be required for one class of goods, would possibly ruin another class. So that, if we give a general view of finishing, there will yet be a necessity for good judgment in the actual work. The finisher who has been successful for years in one place and upon one grade of goods, might fail in a new place because of a difference in the goods, stock, oil, or water used for scouring. For this reason the man who has had the most varied experience, providing he has been an apt scholar, is the best fitted for the work.

The writer has known of a number of instances where men who had learned the business (as they supposed) in first class mills, have

failed to succeed in trying to manage the finishing for a comparatively small concern, and the sole cause of the failures was that they were called to do a class of work different from what they had previously been familiar with.

When a finisher changes from fine all-wool goods to such as are composed of part shoddy or cotton, there is not only a necessity for change in action, but a change in the quality and strength of the soaps used. A soap that would be right for good clean stock, might fail to accomplish the desired results, where there was an extra quantity of foreign matter to overcome, as there always is upon this class of goods. On the other hand, a soap that would be required to properly full and thoroughly cleanse the cheap goods, would no doubt destroy the colors in some better grades. Why these things are so we shall try to explain in some future article.

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This earth of majesty, this seat of Mars,  
This other Eden, demi-paradise,  
This fortress built by nature for herself,  
This precious stone set in the silver sea,  
This blessed plot, this earth, this England,  
This land of such dear souls, this dear, dear land,  
Dear for her reputation through the world." *Shakespeare.*

The diversified scenery in England makes travelling interesting; from the coach window it is a constant panorama. As our time in England was limited, and we wished to see the sights of London we did not spend so much time as we would have liked in rural England. I shall, therefore, let others describe for you its beauties. Wm. Winter thus described them: "Towered cities and the busy hum of men" are soon left behind by the wise traveller in England. A time will come for these, but in his first sojourn there he soon discovers the two things which are utterly to absorb him, which cannot disappoint and which are the fulfilment of all his dreams. These things are the

rustic loveliness of the land, and the charm of its always vital and splendid antiquity. The green lanes, the thatched cottages, the meadows glorious with wild flowers, the little churches covered with dark green ivy, the Tudor fronts festooned with roses, the devious footpaths that wind across wild heaths and long and lonesome fields, the narrow, shining rivers, brimful to their banks, and crossed here and there with gray and moss-grown bridges, the stately elms, whose low-hanging branches droop over a turf of emerald velvet, the gnarled beech trees "that wreath their old fantastic roots so high," the rocks that caw and circle in the air, the sweet winds that blow from fragrant woods, the sheep and the deer that rest in shady places, the pretty children that cluster round the porches of their cleanly, cosy homes

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and peep at the wayfarer as he passes, the numerous and often brilliant birds that at times fill the air with music, the brief, light pleasant rains that ever and anon refresh the landscape—these are some of the every-day joys of rural England; and these are wrapped in a climate that makes life one serene ecstasy. Meantime in rich valleys or on verdant slopes, a thousand old castles and monasteries, ruined or half in ruins, allure the pilgrim's gaze, inspire his imagination, arouse his memory and fill his mind. The best romance of the past and the best reality of the present are his banquet now; and nothing is wanting to the perfection of the feast. "God's finger touched but gently when He made our England," says Mrs. Browning, "so rounded are the contours of hill and vale." A recent American traveller thus describes his impressions of this old

historic land: Wordsworth, standing on Westminster bridge in the early dawn, wrote his exquisite sonnet beginning, "Earth hath not anything to show more fair," and the words echoed in my mind all the 200 miles between Liverpool and London. Scenery wider, grander, more impressive, is to be found in many lands, but search the wide world over and you will find nothing to equal the rich beauty of an English rural landscape. With us it is common for large farms to be cared for under the disadvantage of small incomes; here immense wealth has been lavished on small areas, giving a result that is a perpetual feast to the eye. Land is incalculably more precious than in the New World, yet clumps of noble trees have been left standing here and there in the fields, as well as in the picturesque hedge-rows, serving as divisions between them. The superlative

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finish evidenced on every hand made it seem incredible that the whole stretch of rolling country, as far as the eye could reach, had not been laid out as a great park by some wonderful landscape gardener. There stood the gray stone church, ancient and hoary, and smothered in ivy, and a rectory a fitting match for it in each particular, and between them the "country church-yard," bearing every mark of the one which inspired Gray's immortal "Elegy." Through clustering foliage showed tantalizing glimpses of one of "the stately homes of England," and at a respectful distance below rested the irregular street of tiny thatched cottages and the quaint old inn with its swinging sign. Lastly, half a mile or so from the village,

lay the homestead of the tenant farmer, the dusky purplish-red of the walls and the lighter hue of the room contrasting beautifully with the deep, rich green of the surrounding fields, which enviable tint, by the way, is due to the moisture of the much-abused English climate. The number of very, very pretty little country homes, quite remote from any other habitation, was especially noticeable and memory will always retain a strong impression of such a one, a model of quiet beauty. The picturesque, many gabled old house, its latticed windows framed in ivy and its porch covered with honey-suckle, was embowered in an old fashioned garden, round which ran a hedge, its original prim lines well nigh obliterated.

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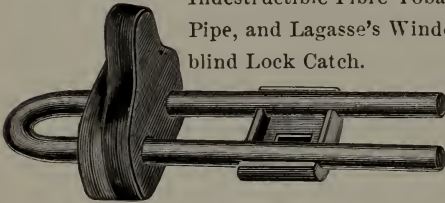
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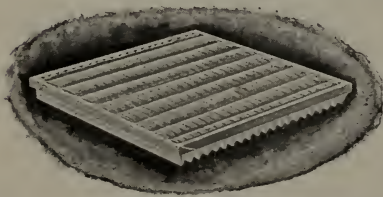


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ated by the rich broidery of pink blossoms which a tangle of brier roses had thrown over it. Two sunny-haired children were playing on the lawn, which sloped gradually down to a tiny lake, on which several snowy swans were gracefully gliding, and whose surface reflected the dappled rose and gold of the sunset sky and over the whole beautiful picture brooded an atmosphere of calm serenity, of unutterable peace.

Another genial writer "to the manor born," Professor Goldwin Smith, thus describes from an intimate acquaintance of many years the varied aspects of rural England: A charm attachès in all our minds to the idea of English country life. Everywhere in the rural districts as you shoot along in the train your eye catches the tower or spire of the parish church, with the rectory adjoining, the hall of the squire,

the homestead of the tenant-farmer, and the laborer's cottage. The parish is the unit and the parish church is still the centre. The clergyman is the parish almoner; by him or his wife, a personage who, if she is good and active, is second only to him in importance, charitable and philanthropic organizations are headed. But the king of the little realm is the master of the hall, which is seen standing in the seclusion of its park. "The stately domes of England" is a phrase full of poetry to our ears, and the life of the dwellers in such homes, as fancy presents it, is the object of our envious admiration. Life in a home of beauty with family portraits and memories, fair gardens, and ancestral trees, with useful and important occupations such as offer themselves to the conscientious squire, yet without any of the dust and sweat of the

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vulgar working world, ought to be not only pleasant but poetic; and the "Summer Place" of Tennyson's "Talking Oak" no doubt has its charming counterpart in reality.

But all depends on the voluntary performance of social duties, without which life in the loveliest and most historic of manor houses is merely sybaritism, aggravated by contrast with the opportunities and surroundings; and unfortunately the voluntary performance of duty of any kind is not the thing to which human nature in any of us is most inclined. The country gentlemen of England are seldom dissolute, the healthiness of their sports in itself is an antidote to sensuality; but many of them are sportsmen and nothing more. Till lately, however, the squire at all events lived in his country-house among his tenants and people; even Squire Western did this, and he thus retained his local influence

and a certain amount of local popularity. But now the Squire, infected by the general restlessness and thirst of pleasure, has taken to living much in London or in the pleasure cities of the Continent. The tie between him and the village has thus been loosened, and in many cases entirely broken.

And now another blow, and one of the most fatal kind, is struck at squirearchy by the political reform which is introducing elective government into the counties. Hitherto the old feudal connection between land and local government has been so far retained that the chief landowners, as justices of the peace, have administered rural justice and collectively managed the affairs of the county in Quarter Sessions. The justice, no doubt, has sometimes been very rural, especially in the case of the poacher, but the management has been good, and it has been entirely free

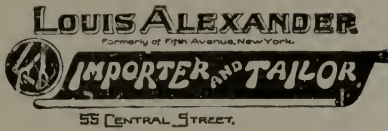
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from corruption. Quarter Sessions, however, are now, in deference to the tendencies of the age, to be replaced by elective councils, from which the small local politician is pretty sure in the end to oust the squire, who, thus left without local dignity or occupation, will have nothing but field sports to draw him to his country seat. Even of field sports the end may be near. Game-preserving will die unlamented by anybody but the game-preserver, for slaughtering barn-door pheasants is sorry work, imprisoning peasants for poaching is sorrier work still, and the temptation to poach is a serious source of rustic demoralization.

Rents have fallen immensely on account of the agricultural depression, caused by the influx of American and Indian grain into the British market; nor is there much

hope of better times. Mortgage debts are heavy, and allowances to widows and younger brothers which the system of primogeniture entails, have still to be paid. Thus the situation of the squire and of the social stricture which he crowns, is perilous. Will he bravely face it? Will he cut down his unnecessary luxuries, learn agriculture, become his own bailiff, give up game-preserving, and renounce idleness and pleasure-hunting for a life of labor and duty? If he does, agricultural depression may prove to him a blessing in disguise. But it is too likely that, instead of this, he will shut up the hall and go away to the city, or perhaps to the Continent, there to live in reduced sybaritism on the remnant of his rents. The hall will then either stand vacant, like the chateau after the Revolution, or pass, as

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not a few of them have already, with its ancestral portraits and memories, into the hands of the rich trader or Jew, perhaps of the American millionaire, who finds better service and more enjoyment of wealth in the less democratic world. A change is evidently at hand, for land can no longer support the three orders of agriculture, landlord, tenant-farmer and laborer. If the Established Church is abolished, as in all likelihood it will be, and the rector departs as well as the squire, the revolution in the rural society of England will be complete.

A great change has come within two generations over the outward vesture of English country life. The old style of farming, with its primitive implements and antiquated ways, with its line of mowers and haymakers in the summer field, with the sound of its

flail in the frosty air, and with many other sights and sounds has been passing away; the new agriculture with machinery has been taking its place. Gone, too, or fast going, is the clay cottage, with the thatched roof, which was the characteristic abode of Hodge, the farm laborer, and the undermost in the three grades of the agricultural hierarchy. Improvising and philanthropic landlordism has now generally substituted the brick house, with slated roof, more civilized than the thatched cottage, though not so picturesque, nor perhaps so comfortable, for the thatch was much warmer than the slate in winter and much cooler in summer.

*To be Continued.*

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## WORSTED SPINNING—Continued.

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The quantity and character of the vegetable impurities are very variable; some wools are remarkable for the large amount they contain. They are often very difficult to remove, owing to being so intimately associated with a number of fibres. The worst in this respect are those fruits which are covered with spines or hooks, such as the "burr," the seed vessel of a species of medicago; as the sheep are feeding, these get entangled among the fibres and work right into the fleece. Special treatment is necessary to remove them and when present in any quantity they reduce the value of the wool often 1-2d or 1d per lb. One of the worst wools in this respect is the Buenos Ayres, which are often really one mass of burrs. At other times we find large quantities of small seeds, thistle and flower heads, twigs, leaves and chaff, all of which are detrimental. The custom which prevails of branding the fleeces with tar is injurious, since

it is extremely difficult to deal with after. Owing to the variation in the quantity of impurities which occur, when purchasing wool, the buyer has to exercise his judgment and rely upon his experience and observations in estimating the probable yield of clean wool, which is one of the factors he must consider in making his valuation. The impurities are always most abundant in the Merinos or Botany wools, ranging in many instances from 50 even up to 70 per cent of the weight of the fleece, as in some of the fine colonial varieties such as the Port Philip, Sydney and Adelaide, while in many of the mountain wools and those of a medium character, they vary from 10 to 20 or 30 per cent. The natural impurities are the most important, they consist of a peculiar greasy or fatty substance termed yolk, which is derived from the skin. Although the spinner regards this yolk as an impurity, it is absolutely essential for the protection of the fibre during

its growth. When deficient the wool loses its softness and pliability, becoming dry, tender and wasty. It varies both with regard to its composition and properties, being a sort of partially decomposed mixture of grease and alkaline matter, having a soapy character. Its color is not always the same, though of an orange or yellow tint, it is sometimes brown and varies from that color to white, or it may have a greenish cast. It does not always exhibit the same consistency, at one time it may be dense, solid and granular, resembling in its toughness wax, or thin and watery, like melted fat. Occasionally it is of a peculiar sticky nature, reminding one of varnish. A secretion of the skin is readily influenced by climatic conditions and food, but, apart from these factors, some sheep individually seem to possess a constitutional tendency to secrete a yolk, remarkable either for its quantity or quality.

An instance is recorded of a ram, perfect in other respect, whose fleece had a "most objectionable white sticky yolk," and which could be found in his offspring for several generations. It is said that "the German and American Regrettes are noted for the objectionable nature of their yolk, while the Australian are almost free from it." When wool of the same type grown

under different conditions or in successive seasons is compared, the effect of climate and food upon the yolk is very apparent. Experienced observers can tell to a large extent, how it will behave in the process of scouring. Occasionally it is distinctly acid, though its normal reaction is alkaline. As a product resulting from the combination of the secretions from two different kinds of glands in the skin, it will be understood that its composition is readily affected, if the proper action of either be restricted or stimulated. "A cold climate, in conjunction with staple feeding, have an undesirable effect on both qualities and quantity of the yolk and nothing will interfere so seriously with its removal in the washing than a diet of grain. A temperate climate combined with pasture feeding not only seems to lessen the quantity of yolk produced, but in addition renders it more soluble." As the action of the sweat glands is more vigorous in a hot climate, to get rid of the superfluous moisture whilst those which secrete the fatty matters are less active, because of the consumption of grass instead of grains, the yolk produced more uniform and in a higher state of decomposition, owing to the alkaline substances predominating.

The yolk, or as chemists term it,



"suint," is a somewhat complex substance being composed of various mineral salts, such as potash, lime, soda, magnesia, combined with animal oils, fats and acids. As stated, its composition varies according to the conditions under which the wool has been grown, but in most cases, potassium salts are the chief constituent. By treating raw greasy wool first with water and afterwards with ether or alcohol, the yolk may be separated into two distinct portions, one soluble in water, consisting of what is termed sudorate of potash, formed by the combination of potash salts with a peculiar oily substance secreted by the skin. This has been shown to be composed of potassium compounds of oleic and stearic acids, together with a small quantity of the fixed and volatile fatty acids, and also chloride and sulphate of potash. The portion of the yolk which remains undissolved by water is treated with boiling alcohol, which acts on the fatty matters, dissolving the neutral fat which consists of cholesterol and isocholesterol, both in the free state and combined with various organic acids, such as acetic and formic.

The portion which is not taken up by the alcohol is composed of compounds of cholesterol and isocholesterol, in combination with

their higher fatty acids stearic and olric acids. Separation may be also effected by treating first with an alcoholic solution of hydrate of potash; this solution is then concentrated by evaporation and afterwards water and ether are added. After thorough admixture by agitation it is afterwards allowed to settle, when it separates in two layers, the ether which forms the upper one containing the cholesterol which may be purified by crystallizing from a mixture of alcohol and ether. If the water containing sudorate of potash be evaporated to dryness, then calcined and the residue afterwards redissolved in boiling water, some of the potassium salts may be separated by crystallization. At about 30° B. the chlorides and sulphates are obtained on cooling, and the remaining solution when evaporated to dryness yields carbonate of potash. By this means it has been estimated that the fleece contains from 7 to 10 per cent. of its weight of potassium carbonate, and on the continent, means are taken to recover and utilize it commercially upon an extensive scale.

Cholesterol is important because of the uses to which it is being put commercially. It possesses the property of mixing with water to the extent of about 100 per cent. of its weight, forming a solid emulsion. It has affinities with both alcohol

and fat, its chemical composition being indicated by  $C_{26}$ ,  $H_{44}$ ,  $O$  melting point,  $145^{\circ}C$ ., and specific gravity 1.067. When pure, it crystallises in white monoclinic tablets; it is not dissolved by water, but is soluble in alcohol, ether and the light oils generally. Being a product of a skin it is readily absorbed by it and is now being extensively used medicinally, as the medium in which drugs are mixed for the treatment of skin diseases. Its emulsion with water is largely used for toilet purposes and is known as Lanolin, Lanolin Pomade, Lanolin Soap.

Chevreul distinguishes two kinds of fat in the yolk which differ in their degree of solubility in alcohol. To one he applied the term stearerin, which, under ordinary conditions, is a solid fat, but melts when subject to a temperature of  $140^{\circ}F$ . It is neutral in its properties, and does not form an emulsion when heated with water, but on boiling with potassium hydrate, emulsification takes place. It is soluble in 1,000 parts of alcohol, having a specific gravity of .808. The second fat he terms Elairerin, which is less dense and melts at  $60^{\circ}F$ ., it also is neutral, but forms an emulsion with boiling water and is saponified by potassium hydrate. The proportion in which they are found varies considerably in differ-

ent wools; if the stearerine be in excess the yolk becomes hard and stiff and difficult to remove in the washing, while the elairerine causes it to be soft in its consistency and easier to deal with in the scouring. Yolk is composed of various mineral substances combined with organic fats and acids. When dried, it yields on analysis from 40 to 50 per cent. mineral and 60 to 50 per cent. organic matters. Further examination shows the ash to consist chiefly of potassium compounds.

Two estimations by Marcker and Schulz, giving :

|                    |       |           |       |
|--------------------|-------|-----------|-------|
| Potash.....        | 58.94 | per cent. | 63.45 |
| Soda.....          | 2.76  | "         | trace |
| Lime.....          | 2.44  | "         | 2.19  |
| Magnesia.....      | 1.07  | "         | .85   |
| Terric Oxide.....  | trace | "         | trace |
| Chloride.....      | 4.25  | "         | 3.83  |
| Sulphuric Acid.... | 3.13  | "         | 5.20  |
| Phosphoric.....    | .73   | "         | .70   |
| Silicic.....       | 1.39  | "         | 1.07  |
| Carbonic.....      | 25.79 | "         | 25.34 |

Another by Maumene and Rogelet gives :

|                                               |       |           |
|-----------------------------------------------|-------|-----------|
| Potassium Carbonate....                       | 86.78 | per cent. |
| Potassium Chloride.....                       | 6.18  | "         |
| Potassium Sulphate ....                       | 2.83  | "         |
| Se $O_3$ , $PO_5$ , Ca O, Mg O,               |       |           |
| Al $_2$ , $O_3$ , Fe $_2$ , $O_3$ , Mn $_2$ , |       |           |
| O $_3$ , Cn O.....                            | 4.21  | "         |

My own observations extending over a large number of examples taken from all classes, show a much greater variation than is indicated in these instances, thus one taken

from wool grown in a lime-stone district was:

|                    |       |           |
|--------------------|-------|-----------|
| Potash .....       | 52.83 | per cent. |
| Soda .....         | 2 42  | "         |
| Lime .....         | 4.72  | "         |
| Magnesia .....     | 2.03  | "         |
| Chloride.....      | 3.72  | "         |
| Sulphuric Acid...  | 5.61  | "         |
| Phosphoric Acid..  | .71   | "         |
| Carbonic Acid....  | 25.61 | "         |
| Silicic Acid.....  | 1.25  | "         |
| Other substances.. | 1 10  | "         |

In order to remove some of the impurities from the fleece, sheep are sometimes washed before shearing. Much difference of opinion exists as to the utility of the operation and whether it does or not injure to some extent the wool. It results in a considerable reduction in cost of transit and enables the buyer to estimate the probable yield with more accuracy. From the farmers' point of view it is desirable, one might almost say essential, because if the water be used for irrigating the land, many of the mineral salts are returned, which would otherwise have been a distinct loss to the soil and expensive to replace. If the wool is to be used directly after shearing no injury is wrought, but when, as is usually the case, a considerable time elapses before it reaches the spinner and it is stored in very highly compressed bales or sheets and kept in all sorts of conditions, then the removal of the yolk has a

decidedly deleterious effect. Having no protective substances, the wool has a tendency to become dry, its softness and elasticity are paired; on the other hand, when allowed to remain packed in the grease too long, the yolk is inclined to become tougher and sticky and tends to stain or discolor the wool, giving it a yellow tint, still it retains its properties better and invariably yields more satisfactory results than when it has been washed. Again the natural soap assists in the scouring, and the manufacturer can recover it if he desires and extract the potash and fats. Mention must also be made of impurities added by the grower, which although perhaps not very important, nevertheless are present. Coloring matters of various kinds are used in order to secure uniformity in the appearance of the sheep, as those who visit the showyards well know, thus the Hampshire Downs are tinted a rich yellow or orange, the Lincoln and Devons red. The introduction of any kind of foreign material whatever into the fleece should be discountenanced; the farmers have no idea of the trouble and injury which the various methods of "doctoring" the wool cause to the fibres and the manufacturer. Under the same category must be placed different smears, dressing and dips employed, their use may be imper-



ative and care should be exercised both in their selection and application, only those adopted, which in addition to securing the desired result, do not injure the wool. We have seen instances where other-

wise superior wool has been completely spoilt through the corrosive action of substances introduced into the fleece. What is required, is to keep the wool as far as possible in its natural condition.

(TO BE CONTINUED.)

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## RURAL ENGLAND—Continued.

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A corresponding change has taken place in Hodge's lot. His wages have been raised, his dwelling and his habits have been improved, and the State has put him to school; while the railroad has opened to him the labor market of the whole country, whereas, before, he was confined to that of his parish, and was practically, like the serf of old, bound to the soil, and took whatever wages the farmer of his parish chose to give him.

In his own sphere he deserves the highest respect. No man has done so hard a day's work as an English laborer; no man has stood so indomitably as a soldier on the blood-stained hillside. If he has frequented too much the village ale-house, in his home he has been generally true and kind to "his old woman" as she has been to "her old man," and there has been a touching dignity in his resignation

to his hard lot and in the mournful complacency with which he has looked forward to "decent burial." He has kept out of the work-house when he could.

The characteristic beauty of England, the beauty in which she has no rival, is of a kind of which mention is fittingly made after a description of her rural society and life. It is the beauty of a land which combines the highest cultivation with a sylvan greenness of an ancient land and a land of lovely homes. The eastern counties are flat and tame. But elsewhere the country is rolling, and from every rising ground the eye ranges over a landscape of extraordinary richness and extraordinary finish. The finish, which is the product of great wealth laid out on a small area, is perhaps more striking than anything else to the stranger who comes from a raw land of promise.

Trees being left in the hedge-rows as well as in the parks and pleasure grounds and in the copses, which serve as cover for game, the general appearance is that of woodland, though every rood of the land is under the highest tillage.

Gray church towers, hamlets, mansions, homesteads, cottages showing themselves everywhere, fill the landscape with human interest. There is many a more picturesque though there is no lovelier land than Old England, and a great body of essentially English poetry from Cowper to Tennyson attest once the unique character and the potency of the charm. The sweetest season is spring, when the landscape is most intensely green, when the May is in bloom in all the helges and the air is full of its fragrance, when the meadows are full of cowslips, the banks of primroses and violets, the woods of the wild hyacinthe. Then you feel the joyous spirit that breathes through certain idyllic passages of Shakespeare.

Her perpetual greenness England owes to her much maligned climate. The rain falls not in a three-days' storm or a waterspout, but in frequent showers throughout the year. On the Western coast, which receives the clouds from the Atlantic, the climate is wet. But the rain-fall elsewhere is not ex-

cessive. England is in the latitude of Labrador. She owes the comparative mildness of her climate to the Gulf Stream and other oceanic influences, the range of which is limited, so that there are, in fact, several climates in the island. In the South tender evergreens flourish and the fig ripens. In the Southwest, on the coast of Devonshire and Cornwall, where the Gulf Stream warms the air, the myrtle flourishes and flowers are seen at Christmas.

Such was the scenery through which we passed on our journey from Liverpool to London. The roadbed was perfect, and the train sped along at times a mile a minute, not stopping even to take water, which we sucked up, whilst the train was going at full speed, from the water-troughs lying parallel to the rails. We pass through several tunnels and over numerous bridges, and precisely on time stepped out at Euston Square station, in the great heart of the Empire. Before describing the sights of London let us spend a short time at the birth-place of the immortal bard of Avon, a place visited by us on our return journey.

#### STRATFORD-ON-AVON.

Thou soft-flowing Avon, by thy silver stream,  
Of things more than mortal sweet Shakespeare  
would dream;

The fairies by moonlight dance round his green  
bed,

For hallow'd the turf is which pillow'd his head

—Garrick.

The following account of this lovely spot is mainly a condensation of and extracts from Wm. Winter's account of Shakespeare's home:

Stratford-on-Avon is a substantial and thriving market town in Warwickshire, which has been called "the garden of England," near the Gloucestershire border, situated in the lovely valley of the Avon, and resting peacefully in the midst of beautiful rural scenery. The country in its neighborhood is under perfect cultivation and for many miles around presents the appearance of a superbly appointed park. For itself it could not fail to be an attractive spot, but that which draws so many tourists to it is the fact that it was Shakespeare's birthplace and that so many memorials of the poet are to be seen there.

"Here his first infant lays sweet Shakespeare sung,  
Here his last accents faltered on his tongue."

More than 300 years have passed since the birth of the immortal bard, and many changes have taken place in his native town within that period. The Stratford of his time contained about 1,400 inhabitants. Today the population is 8,000. New dwellings have arisen where once were fields of wheat, glorious with the lustre of the scarlet poppy. Manufacture chiefly of beer and Shakespearean relics has been

stimulated into prosperous activity. If the poet could walk again through his accustomed haunts, though he would still see the same smiling country round about, and hear, as of old, the ripple of the Avon murmuring in its summer sleep, his eye would rest on very few objects that once he knew. Yet, there are the paths that Shakespeare often trod; there stands the house in which he was born; there is the school in which he was taught; there is the cottage in which he wooed his sweetheart; there are the traces and relics of the mansion in which he died; and there is the church that keeps his dust, so consecrated by the reverence of mankind

"That kings for such a tomb would wish to die."

Most Americans procure lodgings at the ancient Red Horse Inn, once frequented by Shakespeare in his leisure and convivial hours. Washington Irving, the pioneer of American worshippers at the shrine of Shakespeare, stopped here, and the parlor has since that time been called after him. They keep the room very much as it was when he left it; for they are proud of his gentle genius and grateful for his commemorative words. In the corner stands the small old-fashioned hair-cloth arm-chair, in which he sat on that night of memory and of musing, which he has described



in The Sketch Book. A brass plate is affixed to it bearing his name. Every American pilgrim sits in this chair and looks with tender interest on the old fire-place; and reads the memorials of Irving that are hung on the walls. We took a morning stroll along the banks of the gentle Avon. "Here the boy Shakespeare chased the butterfly, and plucked the buttercups, and hunted thrushes' nests, and sported in the crystal stream, and across the meadows the love-sick swain sped to the cottage of sweet Anne Hathaway; beneath these trees they held their tryst, and on their beechen bark he carved her name."

A lad of twelve summers, with a bright, honest face, accosted us and asked if he might show us the sights. We first examined him on his knowledge of Shakespeare. After reciting to us Portia's speech in the trial scene of the Merchant of Venice, and Hamlet's Soliloquy on Death, we hired him for the day. He spoke very broad English, and we found him a very amusing kid. He first took us to the house in which Shakespeare was born. It is a little two-story cottage of timber and plaster, on the North side of Henley-st., in the Western part of the town. Till recently it was in the possession of private individuals. The precious value of the old cottage grew more and more

evident to the English people. Washington Irving made his pilgrimage to Stratford and recounted it in his beautiful Sketch Book. Yet it was not till P. T. Barnum arrived with a proposition to buy it and take it to America that the literary enthusiasm of Great Britain was made to take a practical shape, and this venerated and inestimable relic became, in 1847, a national possession. Passing up a winding wooden stair, we enter the room in which the wondrous baby's first cry was heard. Across this rough floor he crawled on his first voyage of discovery, and through the latticed window he caught his first glimpse of the great world-drama, whose thousand varied scenes he has so marvellously painted for all time. At the left is a small fire-place made in the rectangular form which is still usual. All around the walls are visible the great beams which are the framework of the building—beams of seasoned oak that will last forever. The plastered walls are firm, the huge chimney-stack is as permanent as a rock and the ancient flooring only betrays by the scouped out aspect of its boards and the high polish of the heads of the nails which fasten them down, that it belongs to a period of remote antiquity. Every inch of plaster bears marks of the pencil of reverence. The

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## ANNOUNCEMENT.

We respectfully beg leave to announce to our old customers and the trade generally that we have sold our entire business of manufacturing steam plate presses, etc., known as the Nashua Steam Press and Boiler works, to MR. DAVID SPENCE and MR. ALVAH J. RIDEOUT of this city who will continue the business as our successors at the "old stand," under the firm name of SPENCE & RIDEOUT. This change has been brought about on account of the health of the senior member of our firm. Mr. Spence and Mr. Rideout have been in our employ for many years, are capable and reliable men, and we bespeak for them a continuation of the patronage which we have so largely received for the last thirty years, knowing that they can be trusted to give satisfaction in any orders with which you may favor them. Yours very truly,

J. J. CR. W. FORD & SON.

Nashua, N. H., Oct. 1, 1901.

See advertisement on front inside cover.

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narrow panes of white glass are scrawled all over with names that their worshipful owners have written with diamonds. Byron, Scott, Thackeray, Kean, Tennyson, Dickens and Washington Irving are illustrious among the votaries here and thus recorded. On the chimney-piece, named the "Actors' Pillar," several actors have incised their signatures. In the museum may be seen the desk of Shakespeare, brought from the Grammar school, notched all over with his schoolboy jack-knife. It is very old and is certainly known to have been in the school of the chapel of the Holy Guild 300 years ago. Here is his signet ring and the chair in which he sat. What a potent spell of poetry to bring to this dull Warwickshire town, from all parts of Christendom, 10,000 pilgrims every year to pay their homage at the shrine of genius! Attached to the cottage is a garden

containing the flowers mentioned by him in his works. Here you may see the rosemary, pansies, fenel, columbines, rue, daisies, violets, which make the imperishable garland on Ophelia's grave, and which are the fragrance of her solemn and lovely memory. Our guide next took us to Shottery, not by the carriage way but by the old foot-path across the fields. It was a delightful walk. The wild flowers were blooming along the margin of the path; the gardens and meadows through which it winds were sprinkled with the gorgeous scarlet of the poppy. The cattle and the sheep lazily graze in the rich meadows or recline in the shade of the giant old trees. It is less than a mile from Stratford, stepping westward towards the sunset; and there, nestled beneath the elms, and almost embowered in vines and roses, stands the cottage in which Anne Hathaway was wooed and won. This

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is even more antiquated in appearance than the cottage of Shakespeare and more obviously a relic of the distant past. Entering its parlor you see a stone floor, a wide fireplace, a broad, hospitable hearth, with cosy chimney corners, and near this an old wooden settle, much decayed but still serviceable, on which Shakespeare often sat with Anne—somewhere near. A bedstead with other bits of furniture, together with certain homespun sheets of everlasting linen, are kept as heirlooms to this day in the garret of the Shottery cottage. Mrs. Baker, a venerable old lady, 87 years of age, a descendant of the Hathaways, showed us these relics with much pride. She told me she had lived in the house for 80 years.

We next visited New Place, pur-

chased by the poet when he was 33, and at that time the principal residence in his native town. Here he placed his family and established his home, and here it was that he died. Nothing now remains of it but a portion of the foundations—long buried in the earth, but found and exhumed in comparatively recent days. Its gardens have been redeemed. A mulberry tree—the grandson of the famous mulberry which Shakespeare himself is known to have planted—is growing on the spot now occupied by its renowned ancestor. We ate of the fruit, and the poet in our party felt the inspiration at once; there was a wild, frenzied look in his eye, and I knew that the divine afflatus was upon him, for I had watched him closely before, when he was under

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the spell of sweet poesy. Nothing came of it, however, until we were half way across the Atlantic, when he wrote a neat little poem, which was recited at the concert given on board, and brought great praise upon the poet, in which Jack and I, being his companions, likewise shared.

And now we come to the Church of the Holy Trinity, the resting place of Shakespeare. The parish church is beautifully situated on the banks of the Avon, and would be well worthy of a visit even were there no such associations clustering around it. It is of cruciform shape, and is surrounded by high towering trees, through which very fine glimpses are obtained of the stately spire and old weather-beaten stones. The path up the main entrance is overhung by beautiful elms and is a lovely avenue, cool and pleasant on a hot summer's day, just such a place as we can

imagine the bard would love, and one which was doubtless one of his favorite resorts. Service was being held and we had to wait to see his tomb. He lies buried in the chancel, and on the slab above are the well-known lines:

"Good friend, for Jesus' sake forbear,  
To digg the dust enclosed here;  
Blest be ye man yt spares these stones,  
And curst be he yt moves my bones."

Probably but for these words Shakespeare would have been lying in Westminster Abbey. Close by are the graves of his wife and daughter and a short distance away is the bust of Shakespeare, executed by Gerald Johnson, copied from a mask of his features taken after death, being one of the two authentic representations of him in existence.

Northward, at a little distance from the church stands on the west bank of the Avon the building which will always be famous as the Shakespeare memorial. It was de-

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icated on April 23, 1880. The structure comprises a theatre, a library and a picture gallery.

In the centre of the town there is a memorial fountain erected by G. W. Childs, of Philadelphia, in the year of Queen's Jubilee. There is also an American memorial window in Holy Trinity church. Four miles from Stratford is Charlecote park, where the deer was killed, and the poet was brought before Sir Thomas Lucy, said to be the original of Justice Shallow. It is generally believed that the killing of this deer caused Shakespeare to

leave Stratford and seek his fortunes in London. Hither let us return and see some of its many sights.

*To be continued.*

## GOSSIP.

"F-ll-rs" thoughts are Haff in North Adams, but Howe are Ch-mb-rl-ns?

Who is "Dick" that led the merry chase from Belvidere to the Post Office? The young ladies have been found, but "Dick" is missing.

It seems like old times to learn of broken beds, but this time it was in High street.

An understudy for Rip Van Winkle has been found, but T-yl-r only slept 17 hours.

"W-den-u" is small, but it takes six young ladies to see him home.

"Get to bed" has been appointed guardian of the alarm clock in the Dyeing Lab

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mastered except by thorough practical training. The man who has to do with finishing need never complain of monotony. There is variety enough to keep one from complaining on the score, and to him who becomes interested in it, it proves a pleasant and profitable study.

To realize the difference between mastering the finishing and the other departments, one must take into account not only these various processes and their importance, but he must remember how largely the result is dependent upon good sense and judgment. In the card room it is card, card, card, and that completes the work. To be sure it requires skill and a deal of practical knowledge, with theory combined,

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to master the carding. But the principle is the same on the finisher as on the breakers, and the skill required is to keep the machines in the best possible condition for the work to be done.

In the weaving, also, the work is all on the machine, and when considered in its highest importance it renders it possible to put upon a piece of paper the size of a man's hand, the calculations that will bring about a desired result, while in finishing it is utterly impossible to give any definite directions in regard to the work, but each part must be accompanied by skill and judgement. The fact is, in carding and weaving, as well as in spinning, the perfect action of the machinery has very much to do with the success of the work. While

in finishing, the perfect action of the machinery is as important, yet, without the needed good judgment to accompany each process, the result may be very unsatisfactory. The good condition of the fulling mills does not render it impossible to overheat the goods, nor to fill them too narrow or too much in length, nor does the perfect action of the gig insure against gigging too little or too much.

So it will be seen that the success of the whole work rests very largely upon the constant good judgment of the finisher or his subordinates; and the various processes of the work, differing as they do, present to the young man who would become a finisher many points to be mastered. Hence, in order to succeed as a finisher, he

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must be wide awake and always ready to look into the ways and wherefores of every result, whether favorable or otherwise and thus add to his store of practical knowledge and be better able to guard against a repetition of difficulties and to adopt safe and desirable methods in all the departments of his work.

In some future articles we hope to take up some of the various processes and shall treat of them in a simple way, with a view of helping the young finisher rather than of entertaining those who have had years of experience in the business.

### CLASS OF 1904, LOWELL TEXTILE SCHOOL.

The faculty and students at large have been greatly pleased with the size of the entering class at the Textile School.

Never before in the history of the school has there been such a large freshman class, although the requirements of the entrance examinations have been made more difficult to meet. Coming as the new men do, from all over the country, it shows that though young, the Lowell Textile School has already achieved a high and wide spread reputation.

Friday, October 11, the Principal, Prof. W. W. Crosby, called a meeting of the class, at which it organized and elected the following temporary officers: President, R. P. White of Lowell, secretary, J. F. Dewey of Montpelier, Vt., treasurer, A. E. Jury of Malden, and an executive committee consisting of these officers. R. F. Smith of New Hartford, Conn., and C. A. Burnette of Putnam, Conn., were appointed to draw up a constitution, to be reported at their earliest convenience. Heretofore, on account of the comparatively small student body, the school has been unable to take a prominent part in athletics, but with the material obtainable from the new class much is expected from the school in the future in this line.

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Journal, and will receive prompt attention.

## EDITORIAL.

### ALUMNI.

J. W. Bailey, 1899, has been appointed director of the textile department of the Georgia School of Technology, Atlanta, Ga.

B. M. Parker, 1901, has accepted the position of instructor in cotton carding and spinning at the Clemson College, S. C.

C. J. Brickett, 1900, writes from New Bedford, Mass., and wishes to be remembered to all. C. J. B. is with the American School of Textiles.

John E. Perkins, 1900, writes that he is happy and contented at the Nockege Mills, Fitchburg, Mass.

James H. Cuttle, 1899, has been spending his vacation at Lowell and vicinity. J. H. C. is with the Arlington Mill Company, Chauncy Street, Boston, Mass.

Harry A. Bodwell, 1900, is still at his old post, examiner of machinery, Port of Boston, Boston, Mass.

Tom Nelson, formerly instructor of weaving, Lowell Textile School, has been appointed instructor of weaving and designing in the textile department of the A. and M. College, West Raleigh, N. C.

Mr. Nelson was formerly a student in the evening class, textile design and cloth construction department. We feel sure that Mr.

HEADQUARTERS FOR

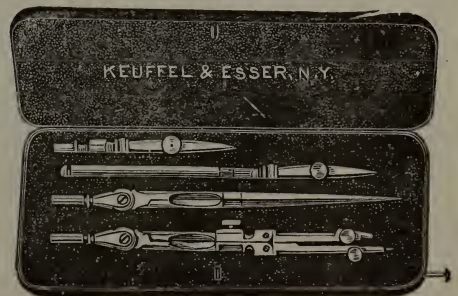
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Nelson will be a success in his new sphere of labor, and what is our loss will certainly be the southern school's gain.

Wm. R. Moorehouse, 1901, has been appointed assistant instructor in chemistry, Lowell Textile School.

D. C. Buchan, 1901, has accepted the position of instructor in power weaving, Lowell Textile School.

...

"Nothing venture, nothing have."

Among all the proverbs with which we are familiar, none, perhaps, contain greater encouragement to progress than the one which is quoted above. It is short, but has a world of significance, and is a potent spur to all who wish to take their part in the upward and onward march of the great army of workers of the present generation. The human soul is ever reaching out after new possessions, and the scripture injunction to "be content

with such things as we have," does not seem to exert much influence in controlling the actions of those who live in this age of progress. And it is a good thing for the community at large that the above quoted injunction has lost its power, for had we or our forefathers been content with the conditions of life as we found them, we should still be without those mighty agencies that are now looked upon as actual necessities of existence. Education, steam appliances, railroads, telegraphs and the printing press, without mentioning the hundreds of other inventions, particularly in the textile industry, all tending to aid comfort which renders life a pleasure.

History furnishes us with countless instances in which men have ventured their life and fortunes to obtain greater things than they possessed and succeeded in their

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efforts. Columbus and Amerigo Vespucci set out to cross the unknown and trackless ocean to discover a new world and were rewarded by finding it. David Livingston and Stanley plunged into the unexplored heart of Africa and brought to light places and people whose existence were previously unknown, daily risking their lives to gain the knowledge they thirsted after, which has benefited the world as themselves. Franklin and Morse, whose names are as "familiar as household words" to us, have given to the world the result of their ventures, and we are

reaping some of the benefits which they succeeded in grasping. Gutenberg spent years of his life and the whole of his fortune to gain to the world the art of printing, and though he did not reap the fruit of his labors as he ought to have done could he revisit the world and see the millions to whom his discovery gives employment in the present day he would feel that his reward was great and that his life was not spent in vain.

Though there are few, if any, new worlds to seek out in our day and though so many discoveries and improvements have been made

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in science and textile manufacturing that it appears almost impossible to find anything new; yet there are other ways by which men may raise themselves from their present position and benefit themselves and others. Many are occupying lowly positions today who

have the knowledge and ability to fill higher places, and yet fear to make the effort to obtain them lest they should lose that which they already possess. And some of these are forever complaining that fortune never comes their way. Others, not so gifted as they, pass

**FAULKNER MANUFACTURING COMPANY,**

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**TALBOT MILLS,  
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GENERALLY USED IN THE NEW ENGLAND MILLS.

Roving Cabs, Doffing Boxes, Packing Cases, and Cloth Boards.

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them on the road of life and secure the prize which might have been theirs. And why? Simply because they stand around "waiting for something to turn up" instead of rolling up their sleeves and going to work to turn up something. It is because they expect to have what they want without risking anything for it, while others make the venture and success crowns their efforts.

Just glance around and see how many, especially in the textile industry and its affiliated trades, were a few years ago working as ordinary laborers, who are now proprietors of establishments, giving employment to hundreds such as they once were. How did they get to the position they now occupy? They had ambition to rise themselves above their condition, and venturing their capital (in some instances very small), backed by a determination to succeed or fail in

the attempt, advancing step by step, overcoming all obstacles, have reached the mark they have set before them and set an example that others might worthily follow. But such a venture as this should not be embarked upon heedlessly.

Another proverb, "Look before you leap," should not be forgotten. Circumstances have to be considered and they are not always favorable to a successful outcome of the venture. But the world is large, and though the opportunity may not arise in the particular locality where you reside to sow the seeds of a future fortune, other places may be waiting for you to put forth your power and willing to grant you every condition necessary to insure success. Manufacturing villages of today, with their mighty commerce and teeming population were unknown a few years ago. Enterprise must have room to spread itself, and if its native place

---

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## STUDY

the points of our different machines and compare with others.

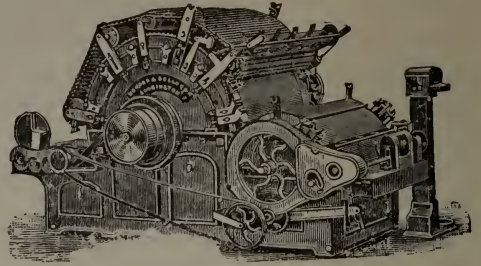
## UNDERSTAND

the merits and you will be convinced beyond a doubt of their superiority.

HOWARD & BULLOUGH

**American Machine Co., Ltd., Pawtucket, R. I.**

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is too circumscribed for its vitality it will seek other localities for the growth and exercise of its powers.

The world must progress; there is no standing still, and you who would keep pace with it must exert yourselves to the utmost, not letting fear get the mastery of you, or you will surely get left in the race. "What man has done, man can do," and more also; so arouse yourselves and put forth all your energies, if you would raise yourselves above the level of an ordinary workman and gain an honored position in life. Every one should endeavor to do something toward leaving the world better than he finds it, and this result is only to be accomplished by an unceasing determination to do your best for your own good and that of your fellow-men.

People put off the paying of little bills where they pay large and more dignified accounts with more promptitude. Our subscription lists run into the hundreds and it is a great burden to collect these little accounts, so we urge upon those who owe us one or more subscriptions to be considerate and respond to this urgent appeal by return mail.

### *THE FOOTBALL TEAM.*

The Lowell Textile School is now entering upon its second attempt at athletics and as the number of students has greatly increased since the first attempt a few years ago, it is sincerely hoped that this time the newly organized Football Team will be the first of stronger and more victorious teams than those of past seasons.

The first practice on the South Common, on Saturday, October 12, was well attended and hopes were entertained for a good

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WOOLEN, and  
WORSTED**MACHINERY**CARD CLOTHING,  
EGYPTIAN COTTON, Etc.

team. The succeeding "line up" on the following Wednesday and Saturday showed a great improvement in the work of the team and it can be truthfully stated that the School will be represented by a comparatively strong team this fall, considering the limited time for practice and the lateness of the season.

Mr. Robert White, who captained the Lowell High School Teams of 1899-1900, was unanimously elected captain of the team and Mr. Edw. J. Bullock of Brown University was elected manager, at the special meeting held Monday, October 14.

Good material for the team is available and strong competition has been created for many of the positions. The several candidates and their relative positions are:

|                                               |                 |
|-----------------------------------------------|-----------------|
| Stone, '03, Edwards, '04, Morrison, '03 and   |                 |
| Clapp, '04,                                   | Ends            |
| Harris, '03, Rothschild, '04, Harris, '04 and |                 |
| Faison, '04,                                  | Tackles         |
| Taylor, '02 and Dewey, '04,                   | Guards          |
| Jury, '04,                                    | Centre          |
| Jones, '04 and Baldwin, '04,                  | Quarter Back    |
| Preston, '04 and Smith, '04,                  | Right Half Back |
| White, '04,                                   | Left Half Back  |
| Ramsdell, '02,                                | Full Back       |

While the team cannot be expected to make more than a fair showing this fall, it is the duty of every student to show his loyalty to the school by giving the team his staunch support and to appreciate the effort being made. The undivided support of each and every student should be given with the result that the students will have

an opportunity in the near future to feel that they will be recognized as supporters of winning teams in every branch of sport in which the school may enter.

It may be possible that funds will be needed to support the different teams and the students will then be afforded a chance to show their loyalty to the school. Do not be "weighed in the balance and found wanting," as the ready subscriber to the fund (if called upon to subscribe) will feel himself repaid tenfold if athletics at the school have been placed on a winning and paying basis by the aid of his individual support, no matter how trifling that support may be.

All students are therefore requested to support the football team through victory or defeat, and if called upon to give a substantial evidence of their faith to come forward and show that they are worthy to be students of the Lowell Textile School.

**CORRESPONDENCE COLUMN.**

Address all communications to Correspondence Columns, Lowell Textile Journal, Lowell, Mass.

Kindly tell me, through the "Journal," if worsted mills, as a rule, size their warps or weave unsized warps. I should also like to know if possible, what the rule is in

**JEREMIAH CLARK MACHINERY COMPANY,**

(Successors to Jeremiah Clark)

**NEW AND SECOND HAND MACHINERY.**

Full Information will be Sent upon Application.

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J. S. TURNER, MANAGER.

HENRY WOODS, Treasurer

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North Chelmsford,  
Mass.Manufacturers  
of**OAK-TANNED LEATHER BELTING,**

Roll Covering, Lace Leather, Leather Aprons, Comb and Machine Brushes, Comb Circles and Fallers. Selling Agents for TURNER'S PATENT WORSTED ROLL COVERING MACHINE. Oil Cans and Mill Supplies of all kinds. Drawing and Spinning Rolls Covered and Bossed. SPECIAL ATTENTION GIVEN TO REPAIRING.

woolen mills on the same subject. Awaiting a reply, I remain, truly yours, K. A. B.

There has been quite a discussion here regarding the use of railway heads. Can you tell us if railway heads are necessary in the manufacture of good cotton yarn and what advantages and disadvantages can be mentioned? Thanking you in advance, yours, C. F. E.

What degree or percentage of humidity is conducive of good results in weaving cotton and worsted warps? Yours sincerely, A. F. C.

I would like to question you in regard to mercerization. Can a short staple cotton be mercerized as successfully and with as good results as long staple cotton? This seems to be a burning question in our part of the country. Truly yours, U. M. P.

**HITS.**

1. S-l-ing! Where is that ratchet?
2. F-ul-r gets \$32 a week. The agent of the second largest mill in the world only gets \$18.
3. Mechanics: H-w-s wonderful 100 feet leap.

4. We wonder why Stev-son walks to the depot every mid-night. Ans. He dares not to ask the landlady where it is.

5. Hair mattresses are cheap, R-b-e got a hair-cut.

6. B-ll-k did not recognize a bar when he saw a leg resting on the same.

7. Cr-g and Fr-gy leave their necks exposed while holding communion with young ladies. Was that a "growler" Cr-g had?

8. With those "boon, boon, boon" stockings on R-s-h-r.

9. That stuff in bottles looked like thirty cents, Ruby. Four for a dollar.

10. Cam-p-l has graduated from the Y. M. C. A. He is now a Christian Endeavor.

11. Stone the boss mule spinner. Salary not considered

12. It must be R-th-ds millions that buys him a place on the football team. He plays like a scrambled egg.

13. We understand R-he now patronizes a Corporation House? What house has he been playing?

TRUTH IS BETTER THAN FICTION.

**"COST FINDING IN COTTON MILLS."**

The only book published on "Cost Finding." Cloth binding price \$1.50.

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Sittings made in Cloudy  
as well as in fair weather.

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55 So. Whipple St., Lowell, Mass., Tel. Connection.



## EXCHANGES.

The Review, High School, Lowell,  
Mass.  
Pratt Institute Monthly, Brooklyn,  
New York.  
English High School Recorder,  
Lynn, Mass.  
Aggie Life, Amherst, Mass.  
High School Bulletin, Lawrence,  
Mass.  
The Blotter, Great Barrington,  
Mass.  
Linden Hall Echo, Lititz, Pa.  
The Radiator, Somerville, Mass.  
The School Record, Newburyport,  
Mass.  
The Normal Pennant, San-Jose,  
Call.  
Ferris Institute News, Big Rapids,  
Mich.

High School Gazette, Lynn, Mass.  
Gates Index, Neligh, Nebraska.  
Panorama, Binghamton, N. Y.  
Res Academical, Wilkes-Barre, Pa.

On Wednesday evening, October 16th, Professor and Mrs. E. H. Barker entertained the faculty and instructors of the Lowell Textile School at a pleasantly informal "at home" reception. During the evening Mr. Crosby spoke very entertainingly on his recently completed European trip. Messrs. Barker, Perkins, Pradel and Buchan gave orchestral selections and Mr. Barker and Mr. Olney sang a few popular songs with the other guests as a chorus. The hit of the evening was a King Cotton Woolly Woolly cake-walk by Messrs. Humphrey and Stewart. Light refreshments were served and several toasts proposed to phases of school life. The best regards of the faculty and instructors are extended to Mr. and Mrs. Barker, with great appreciation of their hospitality.

Established 1870.

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Comb Circles, Fallers, Gills, Etc.

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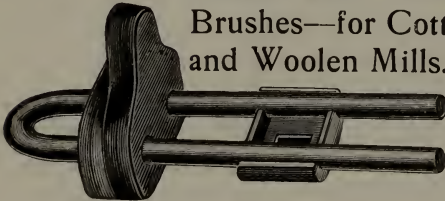
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Laminar Fibre Pitman Arm  
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Loom Picker Tongue, Binder  
Bushing, Pick Lever Bushing  
and Protecting Rod Bushing,  
Bristle and Cotton  
Brushes—for Cotton  
and Woolen Mills.



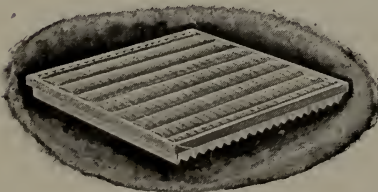
10 in. Lowell Loom Lug.

Double Cushion Steel Lug Pick Motion.



Also Agents for all Kinds of

Ticking Lug Straps,  
Tape Picker Loops and  
The Pearlless Enameled  
Lease Rod . . . . .

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OF EVERY DESCRIPTION.

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*RING'S TEMPLE OF MUSIC, 133 Merrimack Street.*

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## PAN-AMERICAN EXPOSITION.

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William I. Buchanan, director-general of the Pan-American exposition, was from the beginning the only man considered by the exposition authorities for the chief executive office, and they were greatly gratified when he consented to resign from the office of United States Minister to the Argentine Republic to take up the burdens and responsibilities of the management of the exposition. Mr. Buchanan was a National Commissioner from Iowa to the World's Columbian exposition, and the first Chief of Department selected at Chicago, where he not only directed the

affairs of the Department of Agriculture, Forestry and Live Stock, but was a most sagacious and helpful adviser in the general management of the exposition, and was a recognized force in a large organization containing many strong men. The record of his work at that time bears abundant testimony to his uncommon executive ability. In the early part of President Cleveland's second administration Mr. Buchanan was appointed United States Minister to the Argentine Republic—a mission that he filled with great distinction to November 1, 1899.

---

## THE CRYSTAL CAFE . . .

Dinner, 11.30 till 3 o'clock. Oysters and Shell Fish.  
Orders Cooked a specialty. Lunches of all kinds.

140 Worthen Street,

W. S. GRADY, Prop.



PAUL O. KABLE, Assistant.

## SUNLIGHT SHOE STORE,

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**Our Excellent Repairing Department.**

100 Central St., Lowell, Mass.



JOHN G. MILBURN, President.

John G. Milburn, president of the Pan-American Exposition, is a member of the New York State bar and a resident of Buffalo. His fame as a graceful, eloquent and forceful speaker is as wide as the nation itself. He was born in England in 1851, came to America, studied law and was admitted to

practice in 1874. His career has been one of study growth and progress. Mr. Milburn is conspicuous for his public spirit as well as his great success as a lawyer and speaker. He rendered valuable service to his city as a member of the Charter Revision Commission.

**We  
Sell  
Them**

## INCANDESCENT GAS LAMPS, MANTLES, GLOBES SHADES, Etc.

A splendid line of Portable or Reading Lights, the best lights in the world for the house. Also Gas and Oil Heaters, Gas and Stove Tubing and Kerosene goods. COME AND SEE US.

GEO. H. BACHELDER, 122 Middlesex St. cor. Elliot, Lowell.

**\$1000** REWARD will be  
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## GRANT JEWELRY COMPANY,

**WATCHES, DIAMONDS, JEWELRY, SIL-  
VERWARE, IMPORTED CHINA CLOCKS,  
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Fine Watch Repairing.

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Those of you who are in arrear on subscription and desire to have the paper discontinued must pay up in full when ordering it stopped; those of you who desire to remain with us are invited to pay up.

We have received several new contributors during the past month, and hope to receive many more the coming month. Let each one take a hand in this matter and write for your paper; that's what will make it interesting to all.

The correspondence column of the Textile Journal is open to all subscribers. The questions and answers will be from students and subscribers only. The Manager and Editor will not be responsible for the opinions and theories of the writers. The Journal will be pleased to have an intelligent and free discussion on all textile questions.

Read the articles on wool and worsted spinning.

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